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WITH

AN ABSTRACT OF THE PROCEEDINGS AT BOARD AND GENERAL
MEETINGS, AND THE PREMIUMS OFFERED BY
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JOHN STIRTON,
Secretary.

8 Eglinton Crescent,
Edinburgh.

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TRANSACTIONS

OF

THE HIGHLAND AND AGRICULTURAL
SOCIETY OF SCOTLAND

OX WARBLE FLIES.

By R. STEWART MACDOUGALL, M.A., D.Sc., LL.D., Consulting Entomologist, Highland and Agricultural Society of Scotland.

HISTORICAL.

THERE are references to these flies in Roman literature, but exact observation may be dated from the Italian naturalist Vallisnieri, about 1710, who definitely studied the subject and bred out and described the fly. Linnæus, who was Professor in Upsala, Sweden, wrote in 1739 about the warble fly of the reindeer. Towards the end of the eighteenth century and the beginning of the nineteenth, Bracy Clark helped greatly with his published accounts.[1] Brauer, an Austrian entomologist, placed the subject on a sound scientific basis in his monograph[2] on the Warble and Bot Fly family, published in Vienna in 1863. The flies were known and the larva in the swellings on the back of warbled cattle, but the life-history and the mode of invasion of the tissues under the skin were puzzles, and the teaching was at fault. Then in 1888 Hinrichsen, on the Continent, published his finding larvæ internally, in the spinal canal, and suggested (wrongly) that the larvæ were taken up from grass and reached the back from the alimentary tract. Then other workers recorded the finding of Hypoderma larvæ in various internal organs, and the growing Continental literature associated with the names of Schöyen, Joly, Koorevaar, Jost, Koch, Stub, and Gläser, made workers familiar with the internal wandering of warble larvæ. Great interest continued to be taken in the warble question in Denmark, Germany, Holland, France, Norway, Switzerland.

The study of the Hypoderma flies and their life-history assumed a growing importance from the helpful work of

---

[1] 'Transactions of Linnæan Society,' London. Vol. iii., 1797; Vol xv., 1827; Vol. xix., 1843.

[2] 'Monographie der Oestriden,' by Friedrick Brauer.

Schaupp, Curtice and Riley (1890 onwards), culminating in the intensive observational and experimental work of Bishopp,[1] Laake and their colleagues in the Entomological service of the United States Department of Agriculture.

In Canada the work of Dr Seymour Hadwen, detailed in a series of informative papers from 1912 onwards, made one surer, and cleared away difficulties.

In Britain Miss E. A. Ormerod was a pioneer. She took up the subject of warbles enthusiastically and she collected and distributed in Reports and Pamphlets[2] much valuable information as to Warble and Bot flies. Miss Ormerod received encouragement not only in England but also from the Highland and Agricultural Society, whose Secretary, Mr F. N. Menzies, intimated to a General Meeting in 1887 that a circular stating damage done by warble flies had been issued by the Highland and Agricultural Society to 200 Agricultural Associations in Scotland.

In Ireland, in the years preceding the Great War, Carpenter and his colleagues Steen, Prendergast, Corson, Hewitt, Reddin, Phibbs and Slattery did valuable work—observational, experimental, anatomical—settling points that had been long in dispute.

The economic importance of warble flies was stressed in Britain by the Great War, and a Departmental Committee, of which the Highland and Agricultural Society's Entomologist was a member, was appointed in 1918 to make observations and to carry out experiments. This Committee issued its Report in 1926.[3]

The hide merchant, the leatherseller and manufacturer, and the butcher, called for surer control measures, and in 1929 a strong Committee, called together by the Worshipful Company of Leathersellers, was formed, embracing all interests—farmers, butchers, tanners, hide and leather merchants, with Scottish representatives on the Committee. A national campaign was undertaken. The experiments in England were supervised by Mr R. C. Gaut, M.Sc., the County Agricultural Adviser for Worcestershire, and others. Reports from many English counties were received and collated by the Leathersellers Company.

The Highland and Agricultural Society of Scotland, interested in the problem and sympathetic towards the experiments in

---

[1] "The Cattle Grubs or Ox Warbles, their biologies and suggestions for control," by F. C. Bishopp, Entomologist, E. W. Laake, H. M. Brundrett and R. W. Wells. "Investigations affecting the health of animals," Bureau of Entomology, United States Department of Agriculture, Bulletin 1369. April 1926.

[2] 'Flies injurious to Stock, being life-histories and means of prevention of a few kinds commonly injurious, with special observations on ox warble or bot fly.' London, 1900: Simpkin Marshall.

[3] "Report of the Departmental Committee on Warble Fly Pest." Published by His Majesty's Stationery Office, 1926.

England, appointed a Committee for Warble Experimental Work, and co-opted on this Committee the Scottish members of the Worshipful Company of Leathersellers' Committee.

Members of the Scottish Committee.

Colonel F. J. Carruthers, *Convener*.
Sir Ralph Anstruther, Bart.
J. E. Kerr.
William Low.
Dr R. Stewart MacDougall.
Dr T. G. Nasmyth.
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} Highland and Agricultural Society of Scotland.
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T. J. Macpherson, Scottish Hide Inspection and Improvement Society.
William Martin, Glasgow Hide Inspection and Improvement Society.
John A. Sinclair, Scottish Federation of Meat Traders' Association.
John Stirton, Highland and Agricultural Society, 8 Eglinton Crescent, Edinburgh, *Secretary*.

Through the assistance and co-operation of our three Agricultural Colleges—the Edinburgh and East of Scotland College, the West of Scotland College and the North of Scotland College—we were able to extend the work to all Scotland, so that it can be said to-day that experimental work in the way of control by the destruction of the larvæ or grubs in the backs of infested cattle has been carried out, by way of test and demonstration, in practically every part of Scotland. The absence of demonstration work in Orkney and Shetland and in Caithness was due to almost complete absence of warble in these counties.

The combination of the three Colleges not only secured for the work the sympathetic interest of the farming community, but through the three Colleges of Agriculture the problem of organisation was solved by the friendly and very valuable help of their various County Organisers. The Committee were fortunate, too, in securing the assistance of a number of skilled workers who were University graduates in agriculture or holders of Diplomas in agriculture. These men quite understood the problem, and brought a necessary knowledge to bear on the experimental work.

It should be understood that the larvæ treated by the various dressings were, some days later, squeezed out and examined individually, so as to make sure of the effect of the dressing material. Thousands of treated larvæ were so examined, and, in the first year of the experiments, classified according to species.

In any annihilative campaign, dressing for destruction of warble fly larvæ would need to begin by the third week of March (see later). Our experimental work began a little later than this, as the Spring Term had not finished at University or Agricultural College by mid-March.

Two special Reports, descriptive of the work of the Scottish Committee and its results, were published separately and distributed to Members [1] of the Society and also to the Committee of the Worshipful Company of Leathersellers.

The present Review of the work, however, has been prepared so that there may be an actual record in the 'Transactions' of the Highland and Agricultural Society.

The Oestrid family of flies in Britain contains species more or less well known to the stock-owner—viz., the Horse Bot Flies; the Nostril Flies of Sheep and Deer; and the Warble Flies of Cattle and Deer.

The larvæ of the nostril flies live, till full grown, at the top of the nostrils and in the sinuses of the forehead, and in the deer it may be the back of the pharynx; the horse bot larvæ live in the alimentary tract, and the warble fly larvæ, in their latest stages, under the skin.

Fig. 1 illustrates the year's round of life of *Gastrophilus intestinalis*, the commonest of our Horse Bot Flies.

Figs. 2 and 3 show the larvæ of the Horse Bot Fly.

THE HYPODERMA FLIES.

The flies are bee-like with hairy bodies. The larvæ in their latest stages are found, in swellings or warbles, underneath the skin. There are three species in Scotland, two parasitic on cattle and one a parasite of the red deer. The closely allied *Oedemagena tarandi* is parasitic on the reindeer. I recorded the larvæ in 1923 from reindeer in the Edinburgh Zoological Garden.

The two cattle species are *Hypoderma bovis* and *Hypoderma lineatum*.

H. bovis measures just over ½ inch in length. Young people on being shown the fly in a collection have their eye caught by the hairiness and the colour and sometimes call the fly a bee. The face and head are yellowish; the front part of the thorax (fore body) is covered with yellow hairs, the part behind this is black; the hindmost part of the thorax is also black, but in front of the black is a transverse band of yellow hairs. The two flying wings have a brownish appearance, the veins being dark brown. The abdomen or hind body is hairy, yellowish in front, black in the middle, and orange-yellow at the tip. The female has an egg-laying organ (ovipositor) which is really the hind joints of the abdomen telescoped into one another; this ovipositor is adapted for laying eggs but is quite incapable of piercing or stinging. The female of *H. lineatum* has a similar ovipositor.

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[1] 'The Warble Fly Problem.' Report on Experiments conducted in Scotland in 1930. 36 pages.

'The Warble Fly Problem.' Report of Experiments conducted in Scotland in 1931. 75 pages.

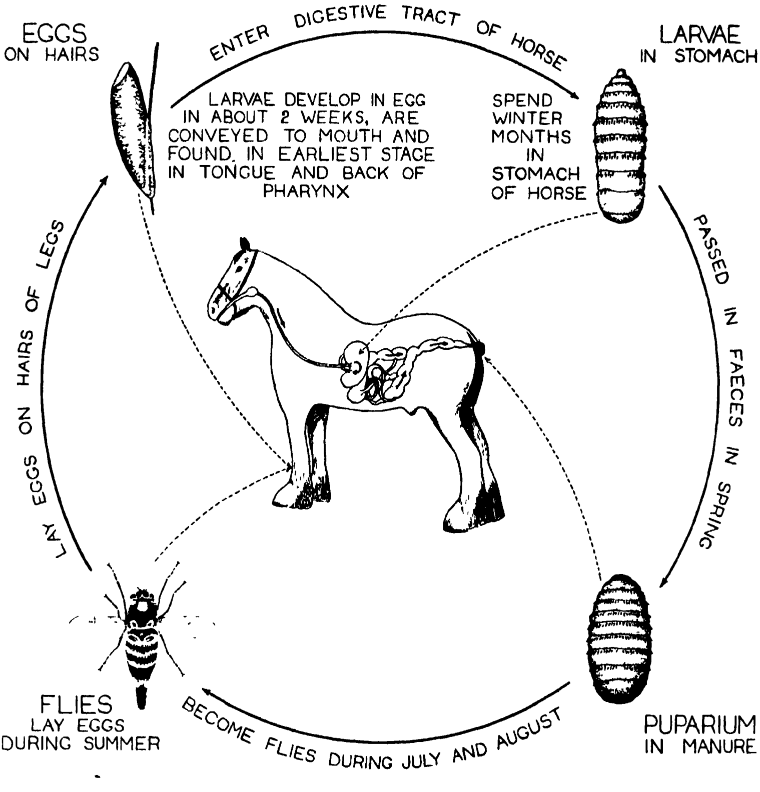
EGGS
ON HAIRS
ENTER DIGESTIVE TRACT OF HORSE
LARVAE
IN STOMACH
LARVAE DEVELOP IN EGG IN ABOUT 2 WEEKS, ARE CONVEYED TO MOUTH AND FOUND IN EARLIEST STAGE IN TONGUE AND BACK OF PHARYNX
SPEND WINTER MONTHS IN STOMACH OF HORSE
LAY EGGS ON HAIRS OF LEGS
PASSED IN FAECES IN SPRING
FLIES
LAY EGGS
DURING SUMMER
BECOME FLIES DURING JULY AND AUGUST
PUPARIUM
IN MANURE

Fig. 1.—*Life-cycle of the Common Horse Bot Fly* (Gastrophilus intestinalis).
Adapted from Circular 378 Agric. Exper. Station, University of Illinois, and drawn for this article by Dr J. N. Oldham.

H. lineatum (Fig. 4) which is slightly smaller than *bovis*, has four conspicuous dark lines down the middle region of the upper surface of the thorax. Hadwen[1] gives as a characteristic

[1] "A further contribution to the biology of *H. lineatum*," by Seymour Hadwen, D.V.Sc., Department of Agriculture, Canada. Bulletin, Scientific Series, No. 21.

difference between the two flies, that *H. bovis* has “clean legs with comparatively few hairs, whereas the legs of *H. lineatum* are rougher and more hairy, especially the tarsi or feet.”

The warble flies can neither bite nor sting. The reader should notice carefully that in these flies the mouth-parts are so reduced that the adults can neither feed, nor bite nor wound.

Fig. 2.—*Larva of* Gastrophilus intestinalis. The spiracles at the hind end have been turned up to expose them.

Magnified.

The larvæ of the warble flies store up in their ‘fat body’ enough reserve to last over the pupal and adult stages, sufficient even for the females to develop and produce their eggs.

Well, if the flies can neither bite nor wound nor sting why do the cattle fear them and stampede? The females are persistent in their egg-laying, chasing the cattle if necessary in order to settle, and then lay their eggs on the hairs. *H. bovis* is more worrying to the cattle than *H. lineatum*, for *bovis* laying only one egg to one hair repeatedly comes and goes, settles and leaves, and this with the hum of the fly and instinctive dread makes the cattle run. The hum of the fly is not loud, but is audible. Bishopp [1] writes of the "listening attitude" of the cattle when the fly is in their vicinity. There is increased sensitiveness when the minute larvæ from the eggs start boring into the skin. Hadwen [2] gives numerous examples from personal observation of how the flies worry and dishearten the cattle by their persistency.

The flies like warm sunny weather—*H. bovis* especially is a fly of the sunshine—and they dislike rain and high wind.

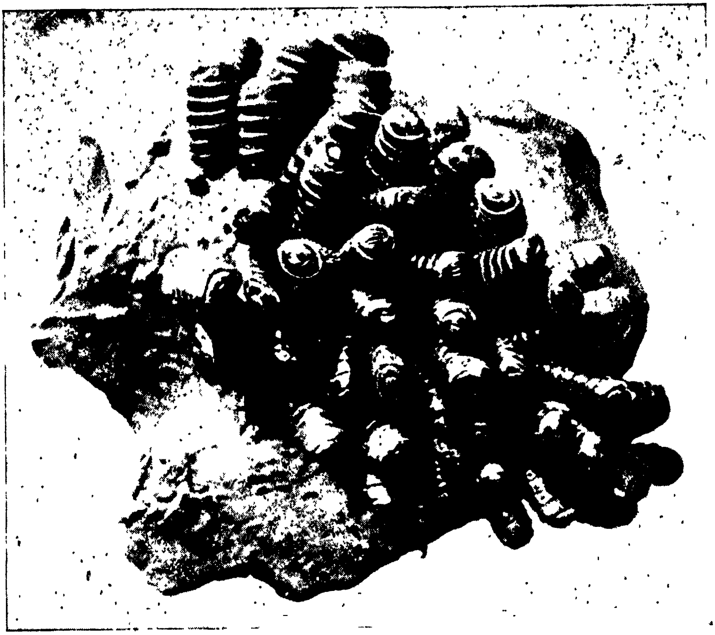

Fig. 3.—*Larvæ of* Gastrophilus intestinalis *attached to stomach.*
From nature. Natural size.

They dislike shade, hence a shed is a good protection against the flies. The flies will not follow cattle into and over water.

The Egg (Fig. 5).—The egg is dull white, with a smooth shell; it is provided with a stalk that has a groove in it; the groove is fitted over the hair of the animal at the time of the laying of the egg and is aided, for attachment, by a sticky secretion. The eggs of *H. bovis* are laid one to a hair; in *H. lineatum* the eggs are in rows (Fig. 6). The eggs are laid well down the hair, an advantage for shelter, warmth, and less distance for the hatched-out larva to travel to the skin.

---

[1] "The Cattle Grubs or Ox Warbles," previously cited.

[2] 'Warble Flies. *Hypoderma lineatum* and *Hypoderma bovis*,' by S. Hadwen, D.V.Sc., F.E.S., Chief Animal Pathologist, Ottawa, Ontario, Dept. of Agric., Canada. Scientific Series, No. 27.

The Larva.—The newly hatched larva (Fig. 7) has special features that have been described in various Continental journals, and also by Carpenter, and by Bishopp and Laake. Glaser and Carpenter were the first to obtain the first-stage larva of *H. bovis* in the free state. In both species this first-stage larva is very spiny, the spines on the hind joint being especially large. The mouth apparatus consists of cutting mouth-hooks and two supporting pharyngeal rods; a spine projects from between the mouth-hooks, fitted for piercing and boring through the tissues. This type of cutting and piercing mouth-

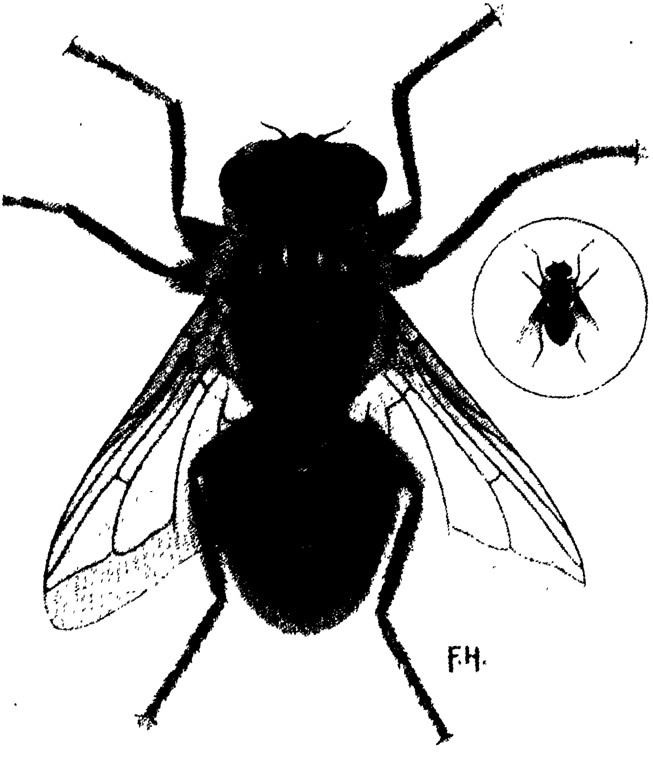

Fig. 4.—Hypoderma lineatum *magnified.* The Small Figure to the right is natural size.

By courtesy from "Warble Flies and their control in Canada," by Eric Hearle, Entomological Branch, Department of Agriculture, Canada.[1]

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[1] Mr Sparle's Pamphlet (No. 147 New Series) has a very happy diagram showing the year's cycle for the Warble Fly.

parts persists during the migration of the larva through the tissues till it reaches the skin of the back; in its second last stage as it lies in the back the larva has only feeble mouth armature.

The second last stage larvæ of *lineatum* and *bovis* are not difficult to distinguish if a preparation be made of the spiracles which are on the hind face of the last joint. Figs. 8 and 9 show these spiracles in *lineatum* and Fig. 10 shows them in *bovis*.

In *H. lineatum* the respiratory area shows a number of little discs or circles which, typically, are less in number than the corresponding discs in *bovis;* and further, the discs are much easier to count owing to their greater separation from one another. In *H. bovis* the discs or circles are more or less joined to one another and the respiratory area is much darker in colour; the rims of the discs, too, are rather thicker and their lumen or enclosed area may be a shade smaller than in *lineatum*. The number of discs in the spiracles of both *H. lineatum* and *H. bovis* varies much, and the number may vary even as regards the right and left respiratory areas of the same larva. Out of 44 counts made by me in the case of *H. lineatum* the lowest numbers of discs or circles were 10,

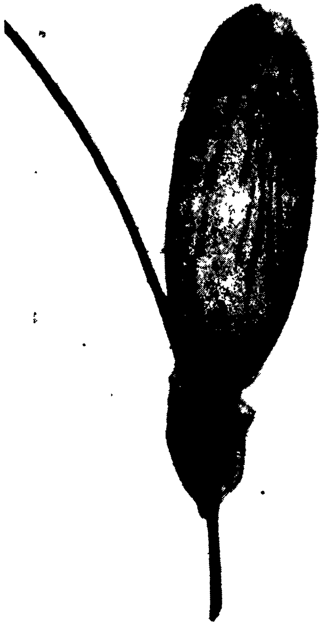

Fig. 5.—*Egg of* Hypoderma bovis.

From nature. Greatly magnified.

13, 14—each once—and the highest number 35, found twice. Out of 60 counts, in the case of *H. bovis*, the lowest number was 20 discs or circles, found once, also once 22 and once 23; the highest number was 45.

The last-stage larva of both *H. lineatum* and *H. bovis* is well known. Figs. 11 and 12 show these final-stage larvæ.

The larvæ of both flies, immediately after the moult of the second last stage larvæ, are white or cream coloured, but as the days pass they gradually darken to brownish and then to black-brown. The stigmal plates, immediately after the moult which reveals them, are pale orange coloured, but they gradually darken from outside inwards. The full-grown last-stage larva has a tough covering; the head end is poorly developed and the mouth armature more feeble even than in

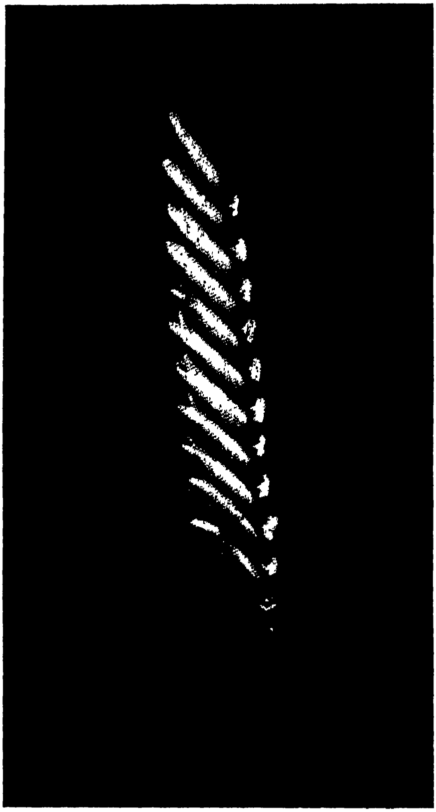

Fig. 6.—*Eggs of* Hypoderma lineatum *attached to hair of cow.* The eggs with the slit at the free end have hatched.

By the courtesy of Professor G. H. Carpenter.

the previous stage, for no mouth-hooks or supporting pharyngeal rods are present. There is a very evident armature of spines on the edges of the segments of the body and the hind stigmal or respiratory plates are prominent (Fig. 13 and Fig. 14). The larvæ of the two species in the last stage are easily distinguished :—

H. lineatum.	*H. bovis.*
Stigmal plates somewhat kidney-shaped.	Stigmal plates ear-like.
The surface of the stigmal plates level or almost level.	The surface of the stigmal plates depressed—*i.e.*, the surface is funnel-like.
The open part of the two C's wider.	The corresponding space narrower.
Armature of spines more prominent, especially on the under or convex surface.	Not so spiny.
The under surface of the joint in front of the last or spiracle-bearing joint, has an armature of spines.	No spines on this second last joint.
Larva rather thinner and more pointed at the ends.	Larva somewhat barrel-shaped and thicker in proportion to the length.

In the course of the growth of the larva from the time of hatching until its final stage is attained several moults take place dividing the larval life into stages or instars. It is difficult to make certain of the number of moults in these larvæ, for they spend so much of their life in the internal tissues of their host, disappearing into the skin on hatching and never showing again at the outside for months, when they reappear under the skin of the back. Laake,[1] in the United States, after prolonged examination of larvæ, takes the view that there are four moults—*i.e.*, five larval stages. In spite of Laake's toilsome work and most helpful tables I am not quite convinced that the moults are not just three, with four larval stages, retaining this opinion as the result of an intensive set of measurements of mouth-hooks and cephalo-pharyngeal skeleton made in my laboratory by Mr J. W. M'Hardy, B.Sc., from a large series of larvæ taken from gullets. Mr M'Hardy had also the advantage of examining a series of microscopic preparations lent by the courtesy of Professor Carpenter.

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[1] "Distinguishing characters of the larval stages of the Ox Warbles," by E. W. Laake in 'Journal of Agric. Research,' Vol. xxi., 1921.

"Further observations on the moults of the Ox Bots, *H. bovis* and *H. lineatum*," by E. W. Laake in 'Journal of Agric. Research,' Vol. xxviii., 1924

The Puparium or Pupal Case (Fig 15).—The puparium is the last moulted skin of the full-grown larva. The puparium retains externally the general appearance of the preceding larva—*i.e.*, the old jointing of the body is evident and the pattern of the hind spiracles; it becomes quite black and narrows somewhat at the head end. Under cover of this pupa-case the adult fly condition is reached. At the front end of the puparium is a more or less circular line or seam—a line of weakness which will give way when the fly, desirous of coming into the open world, pushes against it by means of a tense projection from its forehead.

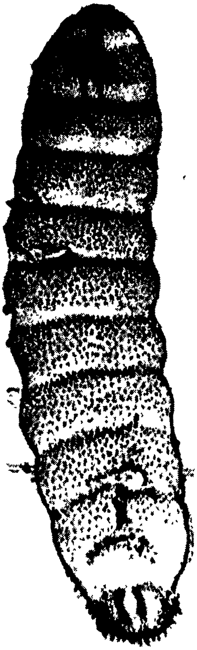

Fig. 7 —*First stage larva of* Hypoderma bovis.
From nature. Greatly magnified.

THE HOSTS OF THE OX WARBLE FLIES.

Cattle are the typical host animals of *H. lineatum* and *H. bovis*, and no breed is immune. Now and again I have heard it said that Highland Cattle are immune because the hide and underlying muscle are too thick for the larva to cut through. One example from my notes will show that, like all other breeds, Highland Cattle can be warbled. Highland Cattle belonging to Mr W. J. L. M'Ewen in the Isle of Muck were examined in March and April and the record was :—

Number warbled.	Age.	Number of larvæ extracted.
16	1 year old	103
8	2 years old	184

In the Isle of Muck the Highland Cattle had access to the sea, and on hot days waded in to avoid the flies.

In America the bison—a close relative of the ox—is also a host animal.

THE RED DEER (*Cervus elaphus*).

In Scotland two species of Oestrid flies are enemies of the red deer—namely, ***Hypoderma diana***, the Deer Warble Fly, and ***Cephenomyia auribarbis***, the Deer Nostril Fly. The larvæ of *H. diana* are found, often in large numbers, in the skin of the back of the deer, just like our *lineatum* and *bovis* larvæ in cattle; the larvæ of the deer nostril fly are found in the nostril and at the back of the pharynx.[1]

The larvæ of the red deer warble fly spoil the hide in the same way that the larvæ of *H. lineatum* and *H. bovis* spoil the hides of cattle (Fig. 16). More than twenty-five years ago I had, from one of my old students in the North, complaints of the deer warble fly larvæ spoiling the deer hides for glove manufacture (Fig. 17).

Again, during the warble fly work of the past three years, both by letter and by word of mouth, I have had enquiries and heard it stated that cattle on farms in the neighbourhood of deer forests owed their warble infestation to the deer warble fly. There is no proof of this and no recorded case of the deer warble fly attacking cattle.

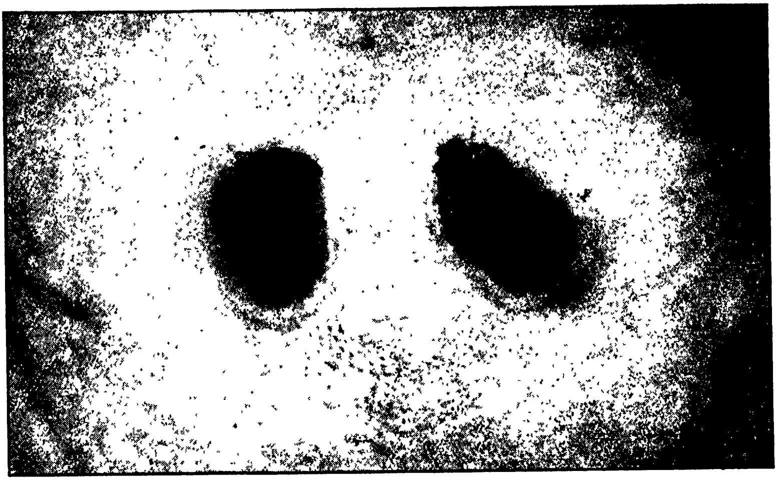

Fig. 8.—*Hind spiracles of second last stage larva of* Hypoderma lineatum. From nature. Magnified.

Through the courtesy of a friend and by the kindness of the stalker, Mr Peter Mowat, I was promised examples of the hide of the deer infested with the larvæ of the deer warble fly. Should such specimens prove suitable I had arranged for an experiment by which the larvæ of the deer warble fly could be removed from the deer and introduced below the skin of calves. In the beginning of January 1933 two specimens of warbled deer hides from the North were sent to me in London; from these two specimens over 200 deer warble larvæ were taken on dissection. The experiments that followed might have been more certain of result if the larvæ had been younger, but the deer were not available at the time of the egg-laying of the deer warble fly, and it is not yet known in what region of the body younger larvæ are to be found before coming to the sub-dermal tissues.

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[1] The student should consult two interesting papers by Dr A. E. Cameron, M.A., of the Department of Zoology, University of Edinburgh—viz., "Arthropod Parasites of the Red Deer in Scotland" in 'Proceedings of the Royal Physical Society,' Vol. xxii., Part 2, 1931-32, and "The Nasal Bot Fly, *Cephenomyia auribarbis*, of the Red Deer" in 'Parasitology,' Vol. xxiv., No. 2, June 1932.

Through the great kindness of Professor J. Basil Buxton, the Director of the Institute of Animal Pathology, University of Cambridge, two calves were offered for the purpose of experiment, with the added advantage of the friendly and skilful assistance of Dr Geoffrey Lepage of the Zoological Staff and of Mr T. J. Bosworth, B.Sc., M.R.C.V.S., D.V.C.M., the Assistant Director, who did the following operations:—

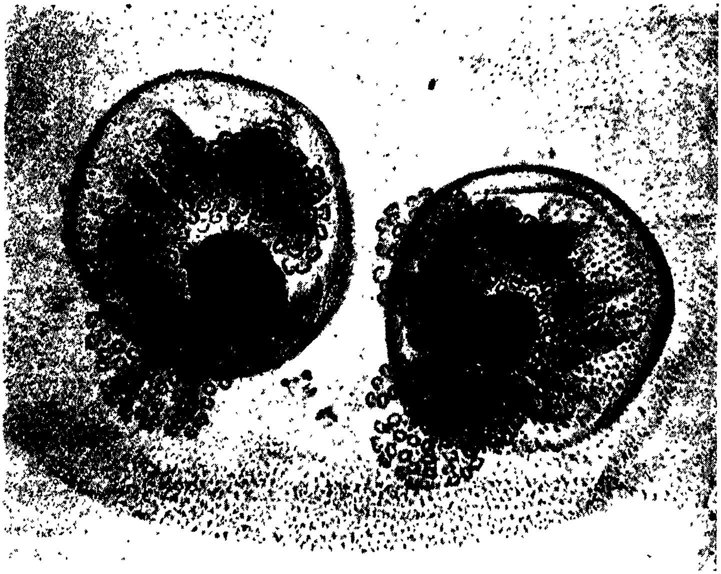

Fig. 9.—*Hind spiracles of second last stage larva of* Hypoderma lineatum.

From nature. Magnified.

When this preparation was made for the microscope the second last stage larva was full grown and about to moult. The micro-photograph shows the large spiracles of the final stage larva ready to come into function when the second last stage larva had moulted.

1. On January 10, 1933, a number of larvæ were carefully freed by dissection from the sub-dermal tissue of a deer. These were transferred successively to several changes of warm sterile solution in order to free them as far as possible from any contaminating bacteria. Twenty of the smallest were

selected for introduction below the skin of the calf. The calf, a Shorthorn, aged nine months, was anæsthetised and an area of skin on the side of the dewlap shaved and disinfected. An incision roughly three inches long was then made parallel to, and about two inches above, the edge of the dewlap. The skin of the calf was dissected back so as to form a pocket to accommodate the larvæ which were transferred to it by means of a very small spoon, and the wound was then sutured. Healing took place satisfactorily, but there was a local swelling about the size of a pullet's egg which was at first œdematous and later became hard and fibrous. This gradually diminished in size, and after a period of four months only a slight degree of thickening remained. There was no evidence of migration of the larvæ and no warble lesions appeared later on, in the back. The calf continues (six months after the operation) in excellent health.

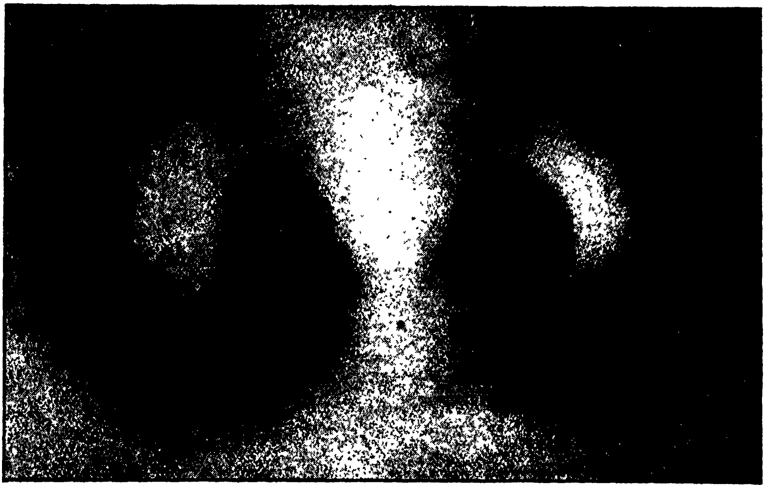

Fig. 10.—*Hind spiracles of second last stage larva of* Hypoderma bovis.

From nature. Magnified.

In this preparation for the microscope the spiracles of the second last stage larva are about to be moulted off and replaced by the spiracles of the last stage larva; the outline of the last stage spiracles is seen right and left of the second last stage spiracles.

On the 18th of January a second specimen of warbled deer hide came to me.

2. Exactly similar procedure was adopted as in Experiment 1, the experiment being done on the same day as the receipt of the hide from Sutherlandshire.

The second calf, a Guernsey, six months old, had transferred to it twenty small larvæ obtained from the skin of the deer. All the larvæ were noticeably active immediately before insertion. Here, again, the operation wound seemed to heal satisfactorily, leaving a local swelling very similar to the previous case. A week later, however, a large and apparently independent swelling developed, on the upper part of the animal's neck; the swelling was opened and drained. The origin of this swelling, which was quite four inches above the operation wound, could not be satisfactorily explained. Against the view of infection having gained an entrance as a result of the operative procedure was the fact of there being no obvious connection between the swelling and the operation wound, which was practically healed at the time the swelling was noticed. As with the first calf there was no evidence of further development of larva and no larvæ appeared later in the back. This calf also continues in excellent condition.

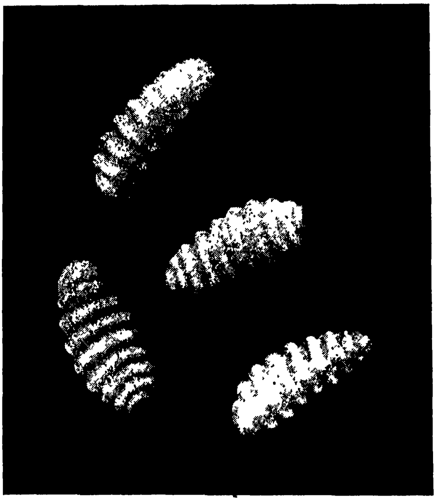

Fig. 11.—*Final stage* Hypoderma lineatum *larva at the beginning of the instar.*

From nature. Natural size.

Man as host.—There are fairly numerous records of the presence of the warble larva in man, but the occurrence is more or less accidental. Larvæ have been taken from the skin of the face of children in Scotland. Bishopp [1] and his colleagues quote cases of extraction of *lineatum* larvæ from the neck and shoulder of children. Hinrichsen took a *bovis* larva from the arm of a boy. Schöyen records in Norway larvæ from men who had been in constant contact with cattle; the swellings were on head, neck and shoulder.

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[1] "The Cattle Grubs or Ox Warbles, their biologies and suggestions for Control," by F. C. Bishopp, E. W. Laake, H. M. Brundrett and R. W. Wells, Department Bulletin No. 1369, United States Department of Agriculture, April 1926.

The Horse as host.—There are records in Scotland, England and Wales of *Hypoderma* larvæ on the horse.

The Sheep.—I know of no natural record on sheep. In 1933 an example was reported to me, but on following it up the case had nothing to do with warble flies.

The Goat.—In India the goat has its own species of warble fly, *Hypoderma crossii.*

DIFFICULTY ABOUT THE LIFE-HISTORY.

In our work, and with questions asked, a common difficulty about the life-history of the warble flies was the migration of the larvæ from the leg to the back. Before stating the round of life of the warble flies I will quote some examples, from the literature, of the ability of the warble larvæ to wander internally.

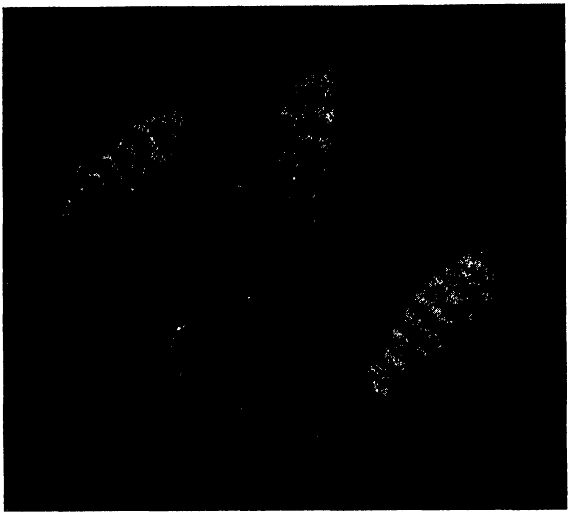

Fig. 12.—*Final stage larva of* Hypoderma bovis.
From nature. Natural size.

Koorevaar,[1] a Dutch veterinary surgeon, records, as quoted by Imms, how he took eleven warble larvæ found in the spinal canal of a calf and experimentally introduced them below the skin "in the left lumbar region of a small dog." The wound quickly healed. Eighteen days later, with the same dog, Koorevaar placed other fifteen larvæ below the skin of the right side. The dog was killed in a fortnight for the purpose of searching for the larvæ by dissection. The whole twenty-six larvæ were recovered. The wandering in the short time had been considerable. "Five of the larvæ were found still beneath the skin, and of these one was found in the left costal wall, one in front of the shoulder, one in the right thigh, one on the skull, and a fifth on the jaw. Six of the larvæ were found lying free in the peritoneal cavity between the folds of the intestine, and a further five were discovered in the fat of the spleen, kidneys, omentum, inguinal canal and the retro-peritoneal tissue. On removing the kidneys, three larvæ were found on the psoas muscles and three more were met with in the wall of the gullet, two others in the peritracheal tissue and two in the spinal canal between the dura mater and the peritoneum."

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[1] "*Hypoderma bovis* und ihre Jungsten Larven," by P. Koorevaar in 'Centralblatt für Bakter und Parasiten,' Vol. xxiii., 1898.

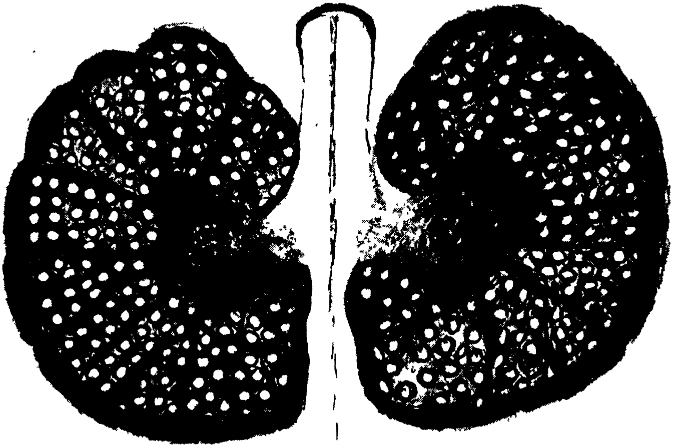

Fig. 13.—*Spiracles of last stage larva of* Hypoderma lineatum.
Drawn from nature. Magnified.

Stub, of Copenhagen, is quoted by Bishopp [1] thus: "In a post-mortem Stub observed an infiltrated area in the superficial connective tissue on the inside of the right tibia, and succeeded in following the track over the shoulder around the muscles of the neck, to the tissue on the gullet where it enters the thoracic cavity. Here he found a number of larvæ in close proximity and measuring just over $\frac{1}{25}$ inch."

Hadwen [2] records experiments. In one, twenty-five larvæ were placed on January 25, 1914, "in a pocket on the left hind-quarter of a November calf and on February 2 several of the grubs had reached the back."

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[1] Bulletin 1369 already cited.

[2] "Warble Flies, *Hypoderma lineatum* and *Hypoderma bovis*," by S. Hadwen, D.V.Sc., F.E.S., Chief Animal Pathologist, Ottawa, Department of Agric., Canada. Scientific Series, No. 27, July 1919.

In another experiment, November 17, 1914, with a three weeks' old calf, "five larvæ were slipped under the hide on the outside of the knee; twenty days later two of the larvæ had punctured the skin on the calf's back. The calf was killed and the leg skinned. A gelatinous track was found at the point where the larvæ had been introduced—viz., on the outside of the knee at a point over the tendons of the extensor muscles. Following this track it was found to extend in towards the radius, passing round it posteriorly, upwards under the elbow joint to the scapula. A larva was found about two-thirds the way up this bone, near the posterior border. The track was plainly visible in the white fibrous tissue."

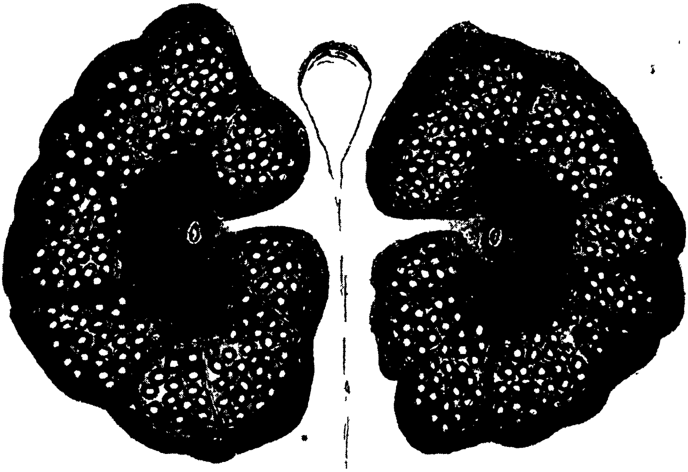

Fig. 14.—*Spiracles of last stage larva of* Hypoderma bovis. Drawn from nature. Magnified.

Bishopp and his colleagues, in a single year, removed 1140 *lineatum* larvæ from gullets. A series of gullets from the Edinburgh abattoir were, seven years ago, dissected in my laboratory at the University of Edinburgh by Mr J. W. M'Hardy and yielded 186 young larvæ, all *lineatum*. The usual place for these young larvæ was the sub-mucous coat of the gullet, between the mucosa and the muscular coat. The lowest number found in a gullet was one, the highest thirty-four. It is from the gullet that the *lineatum* larvæ migrate to the back (Fig. 18).

HOW DO THE WARBLE LARVÆ GAIN ENTRY TO THE HOST?

There has been much variation in opinion, as stated in the literature. The eggs measure less than $\frac{1}{25}$ inch, and hidden in the hair are difficult to see and find, hence the view was held that the female pierced the skin with her ovipositor and so on hatching the tiny maggot was already under the skin. But the ovipositor was shown to be quite unfitted for piercing; besides, the eggs when examined were found to be provided with attachment stalks, and so the view that the eggs were laid under the skin had to be given up.

Following the lead of America as regards *H. lineatum* the belief was strong—and not unlikely—that the larvæ gained entry to the gullet by way of the mouth; that the larvæ, hatched from eggs laid on the hairs of the leg, were conveyed to the mouth by the tongue. Koorevaar[1] almost alone held to the view that the newly hatched larvæ entered the skin at once.

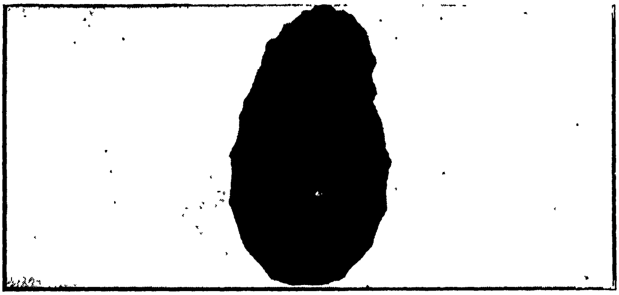

Fig. 15.—*Puparium of* H. bovis *from which the fly has issued.* From nature. Magnified.

In numerous experiments muzzled calves—the muzzle was removed only when the calves were brought in to be fed, but the protective arrangements were such that the calves could not lick themselves—unable to lick larvæ into the mouth were yet badly warbled. Again, newly hatched warble larvæ, placed on the hair and skin, were seen to bore into the skin. Actual observation of what happened in nature confirmed the view of direct entry of the newly hatched larva. This entry is painful, as indicated by the restlessness of affected animals, the shaking of the foot, the nosing and licking the places when these were reachable.

Carpenter's[2] experience with *H. bovis* and *H. lineatum* may be quoted. Hewitt and Wheelan, collaborating with Carpenter in 1914, placed seven larvæ of *H. bovis*—newly hatched in an incubator—on the shoulder of a calf where the skin had not been shaven, though the hair was clipped close. The seven young larvæ were watched through a lens; they crawled down the clipped hair, cut right into the skin and in time disappeared. The boring until the time of their disappearance took about six hours. "Next morning there were three little eruptions or pimples just where the larvæ had entered, and we found four other little pimples indicating where the other larvæ had also bored in. On the calf from which the eggs had been taken we let about a dozen eggs remain on the hairs; these were taken off on the succeeding morning and found to be empty shells. The skin near these, when examined, exhibited a number of small pimples easily seen with the naked eye; they became a little larger during the day, and apparently burst during the following night, because next morning they were dried up and a small scab had been formed. We examined them, but found no trace of the larvæ. In about a week all trace of the pimples was gone, not even a scar being left. The calf experimented on was one of the muzzled lot, and was kept for three days tied between stakes to facilitate observations, so that it could not injure the eruptions by rubbing them. The calf appeared to feel the larva piercing

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[1] "De Larvatvorstand van *Hypoderma bovis*," by P. Koorevaar in 'Tijdschrift der Nederlandische Dierkundige Vereenigung,' 1898. Translated by Austin in 'Ann. Mag. Nat. Hist.' Ser. 7, Vol. iv., 1899.

[2] "Some new observations on the life-history of Warble Flies. The entrance of the maggot into the host's body," by Carpenter and Hewitt, 'Irish Naturalist,' October 1914.

Fig. 16.—*Under-side of hide of Red Deer showing cysts, each of which contains a larva of* Hypoderma diana.

From nature. Reduced.

the skin at first, because its restlessness made examination difficult, but the symptoms of discomfort soon passed away."

Hadwen's experiments in 1915 with *lineatum* not only confirmed Carpenter and Hewitt and Wheelan's observations of 1914 of the penetration of the skin by *H. bovis*, but they supplemented earlier observations on *H. lineatum*. Previously, in June 1913, Carpenter [1] and Lang had found at Athenry Agricultural Station, County Galway, that a number of eggs of *H. lineatum* had been laid on the hairs of cows' thighs, not far below the root of the tail. The scant hair at this place favoured observation, as also did the fact that the cows stood quietly in the byre. " A few days after the eggs had been laid, a soreness was observed in the neighbouring region of the skin with a discharge of matter. On looking with a lens at the skin near the newly laid eggs we saw that it was perforated with minute holes, from which flowed a watery discharge, hardening on the surface to form a scaly deposit. After a day or two the region became covered with small pimples, which disappeared a few days later. On squeezing the skin of the earliest ' case ' that could be obtained, some clear watery fluid exuded from the holes, and on examining a smear of this under the microscope, we were delighted to find a newly hatched maggot of *H. lineatum*."

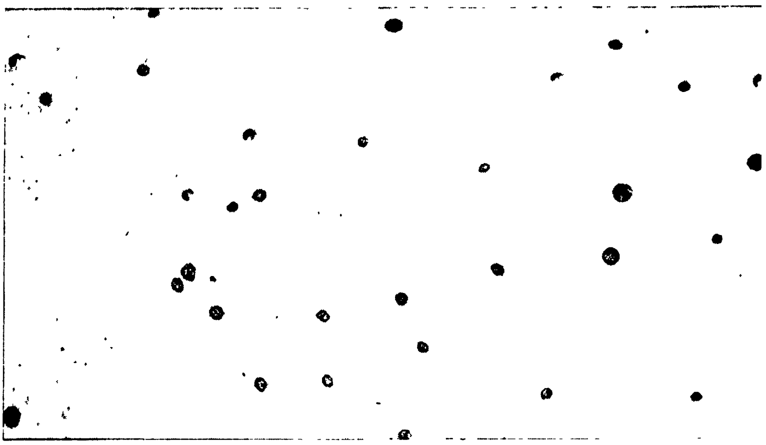

Fig. 17.—*Warbled hide of Red Deer after tanning.*

One regrets that space does not allow of quotation of the thorough and convincing experiments of Bishopp and his colleagues in the United States, and Hadwen in Canada, proving the direct entry of the warble fly larvæ, and describing the lesions resulting.

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[1] "Fourth Report on experiments and observations as to life-history and treatment of Warble Flies," by G. H. Carpenter and T. K. Reddin in 'Journ. Dep. Agr. Tech. Instr.' Ireland. Vol. xv., 1914.

LIFE-HISTORIES OF THE WARBLE FLIES (Fig. 19).

The cycle is an annual one—one generation in the year—the greater part of the time being spent as larva, in the host animal, hidden for a number of months in internal tissues and found in its last stages lying in a chamber or cyst in the back. The chamber communicates with the outside by means of a hole cut in the skin by the larva which has migrated from the gullet (or in the case of *H. bovis* from elsewhere).

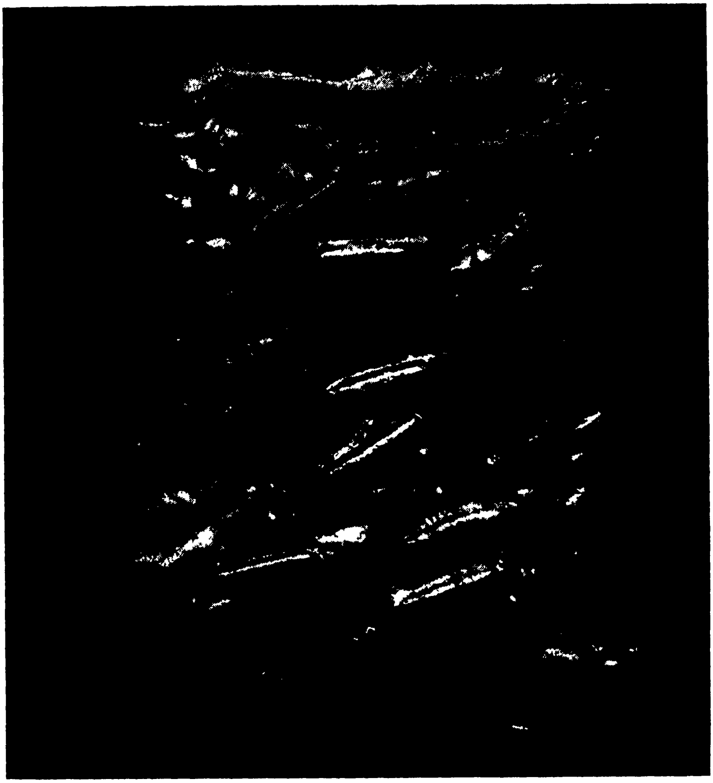

Fig. 18.—*Early stage larvæ of* Hypoderma lineatum *in gullet of Ox.*
Natural size. From nature.

To prevent confusion we will adopt in this account Laake's view that the larva in the course of its life passes through five stages, with four moults.

The first warble flies of the year come from their pupal cases in the soil or in shelter-places on the ground in early summer and throughout summer. Pairing takes place and the fertilised female proceeds to her egg-laying, the eggs being attached to the hairs of the host (Figs. 5 and 6). The commonest place for the eggs is on the legs. Curtice and Riley as far back as 1892 stated that *lineatum* had a preference for round the heel and also for the flanks. Glaser confirmed this. Bishopp and his colleagues state that *lineatum* approaches the animal more stealthily than *bovis*. The female sometimes alights directly on the heel, usually below the dew-claws, and immediately extending her ovipositor, grasps the hair and fixes her eggs. Again both Hadwen [1] and Bishopp [2] have observed *lineatum* backing towards the heel of a standing animal; then while

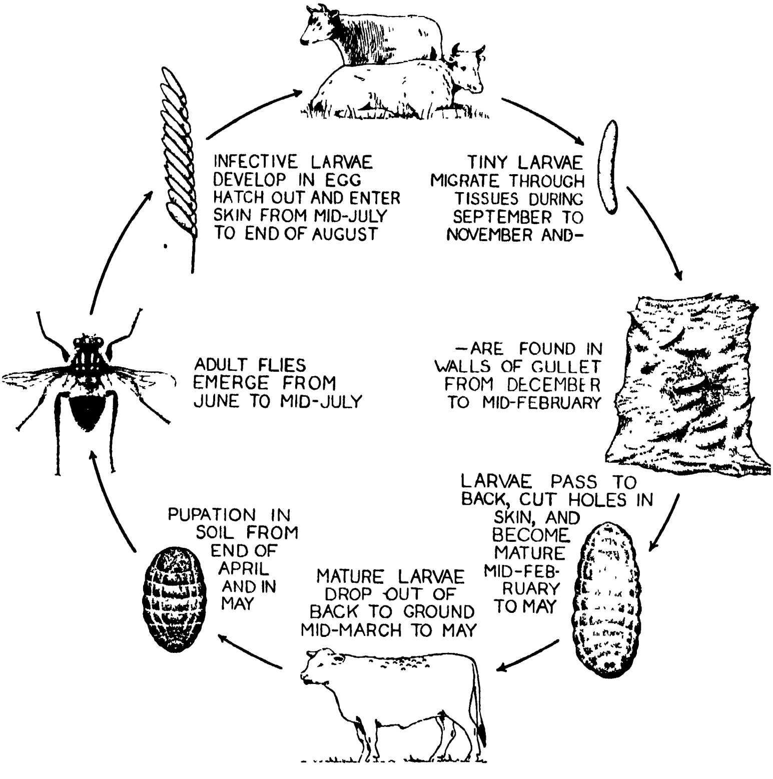
INFECTIVE LARVAE DEVELOP IN EGG HATCH OUT AND ENTER SKIN FROM MID-JULY TO END OF AUGUST
TINY LARVAE MIGRATE THROUGH TISSUES DURING SEPTEMBER TO NOVEMBER AND-
-ARE FOUND IN WALLS OF GULLET FROM DECEMBER TO MID-FEBRUARY
LARVAE PASS TO BACK, CUT HOLES IN SKIN, AND BECOME MATURE MID-FEBRUARY TO MAY
MATURE LARVAE DROP OUT OF BACK TO GROUND MID-MARCH TO MAY
PUPATION IN SOIL FROM END OF APRIL AND IN MAY
ADULT FLIES EMERGE FROM JUNE TO MID-JULY

Fig. 19.—*The year's life-cycle of* Hypoderma lineatum.
Drawn for this Article by Dr J. N. OLDHAM.

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[1] "A Further Contribution on the Biology of *H. lineatum*." Bulletin No. 21. Department of Agriculture, Health of Animals Branch, Canada. 1916.

[2] Bulletin No. 1369 already cited.

still remaining on the ground, the female *lineatum* extended her ovipositor, reached the projecting hairs and laid her eggs. The same observers have found *lineatum* laying eggs on different parts of animals when the animals were lying down.

H. bovis approaches more boldly, and worries the beasts more. Glaser and Carpenter observed *bovis* laying on the legs, not confining herself to any particular part, but showing a distinct preference for the heel or hock-part of the hind limbs. Mote [1] has observed *H. bovis* to strike animals in the following places: "side of abdomen, region of rear heel, fore-leg, rear leg, region of rump, under side of abdomen, outer thigh, and left fore-leg just above knee" (Fig. 20). All observers are in agreement that *H. bovis* worries cattle more than *lineatum*, and this is partly due to the come and go of *bovis*, which lays only one egg to a hair, and which very persistently pursues the cattle.

A single female can lay some hundreds of eggs. The female warble fly has two ovaries; each ovary consists of more than 100 ovarian tubules and each ovarian tubule holds three or four eggs.

The eggs hatch in a week. The larva pierces the shell by striking the front part of the egg with its median spine; then widening the slit by means of its cutting or tearing mouth-hooks it leaves the egg by the aid of the backwards-directed spines of the body. The larva then crawls down to the base of the hair and cuts its way into and under the skin, not to be visible again from the outside until months later, when it has reached the back.

The larvæ having entered the skin, in time reach the gullet. Fig. 18 shows the young larvæ in the gullet. December, January and February are not uncommon months for finding the larvæ in the gullet, but they are found both earlier and later. The outward and visible sign of the presence of a larva in the gullet is an inflammatory infiltration in the neighbourhood. After moving here and there in the gullet, the larvæ migrate to and reach the skin of the back. It is Laake's third-stage larva which leaves the gullet and reaches the back.

It should be noted that *H. bovis* larva does not seem to migrate to the gullet on its way to the back; the route by which the young *bovis* larva travels from skin to back is a secret not yet extorted from nature.

The exact route of the *lineatum* larvæ from the gullet to the back is difficult to define. Doubtless the final position is reached by different roads—*e.g.*, by the diaphragm or by the spinal canal. Hadwen [2] suggests a gradual working towards the diaphragm end of the gullet, then across the diaphragm to follow the ribs in the neighbourhood. The

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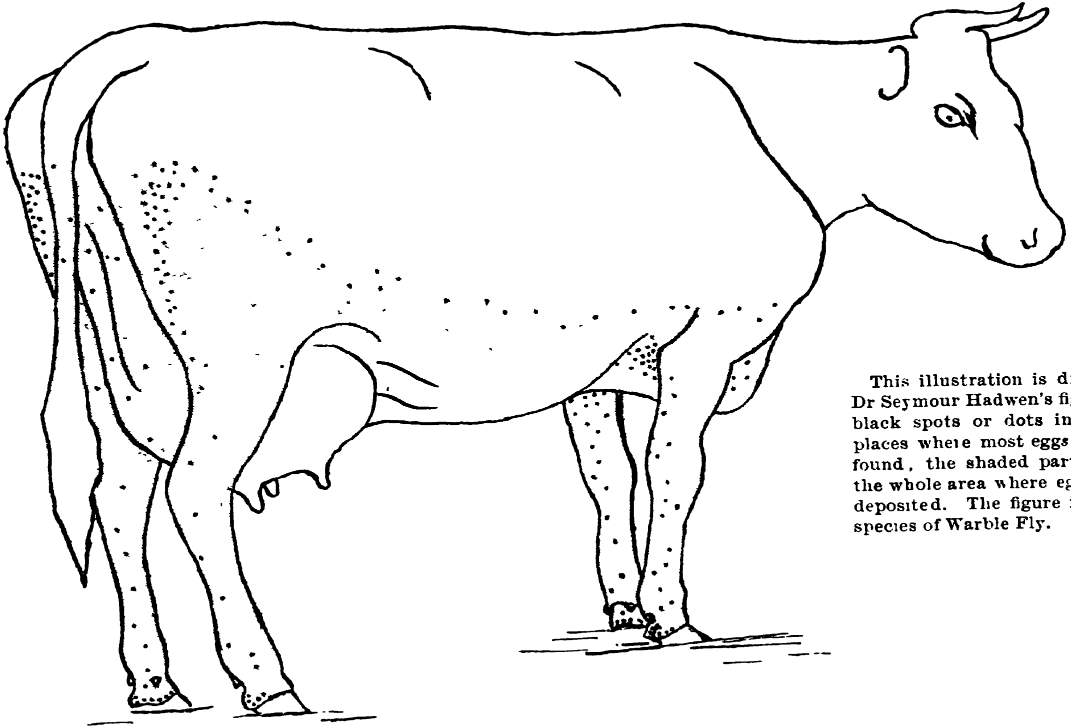
[1] "The Ox Warble Flies." By Don. C. Mote. Ohio Experiment Station Bulletin 428.

[2] "Warble Flies," by Dr S. Hadwen in 'Parasitology,' Vol. vii., 1915.



This illustration is drawn from Dr Seymour Hadwen's figure. The black spots or dots indicate the places where most eggs have been found, the shaded parts indicate the whole area where eggs may be deposited. The figure is for both species of Warble Fly.

Fig. 20.—*Regions where Warble Fly eggs were deposited.*

larva next passes between the intercostal muscles, reaches the upper part of the intercostal space, enters the spinal canal through the posterior foramen, and finally reaches the skin of the back. Or perhaps the larvæ on leaving the gullet pass through the pillars of the diaphragm on their way to the spinal cord, thence later "through the intermuscular connective tissue of the muscles of the back to the skin of the back."

The larva from the gullet having reached the back makes an opening through the skin to the outside, and this accomplished the larva soon moults. There are signs of the presence of warble fly larvæ in the sub-dermal tissues before the hole to the outside is cut through the skin. The presence of larvæ that have reached the skin of the back and will soon communicate with the open, through a small hole made in the skin, is more or less marked by swellings of the area; the swellings are sensitive. In animals with a very thin coat careful inspection may reveal the inflamed places, but they are far more readily appreciated as swellings if one runs the fingers over the back. Very careful examination will show in the centre of the swelling a minute pale circle or dot through which the blood shines. Then will follow the cutting or making of the hole leading from the larvæ to the outside.

In the 1930 work in Wigtownshire Mr A. E. Stevenson called attention to these swollen places and the 'blood-spot'; and again in 1931 Mr J. R. Raeburn, working in Mid-Lothian and East Lothian, marked these places as places not ready for dressing.

The two last stages of the warble fly larvæ are passed in the back, but the larvæ in these stages do not bore nor move about. The tissues of the host animal react to the presence of the fourth and fifth-stage sedentary larvæ and form a cyst round the larva (Fig. 21), and in this chamber with its opening to the outside the larva completes its growth. The larva lies in the cyst horizontally with the hind spiracles arranged at the hole in the skin for the intake of air. In these last stages the larvæ feed on the products of the inflammation induced by their spines and their muscular contractions.

The reaction of the host tissues to the non-migrating last two stages of the larva is interesting. If the migrating larva had remained restful elsewhere in the tissues of the host it would have been cut off by cyst formation without being able to complete its development and reach the outside. The whole story of this migration from skin of leg to the back is wonderful, and raises interesting questions as to the stimuli or perhaps tropisms which may play a part. The journeying can be so regular, although there is considerable mortality of larvæ by loss of direction, as also—as has been noticeable in our work—in the last stages in the sub-dermal tissues. Just to attribute the wanderings of parasites within the body to histropism or the attraction of certain tissues of the animal body for certain parasites, is, as Lepage says,[1] begging the question. In its passage from skin to back, including its stay in the gullet, the warble larvæ take the line of least resistance—viz., the softer connective tissues—and keep moving. To follow up the path of the larva in the tissues is difficult or impossible; some aid may result from a line of discolouration due to bacterial action, the bacteria having gained entry with the larva from the egg.

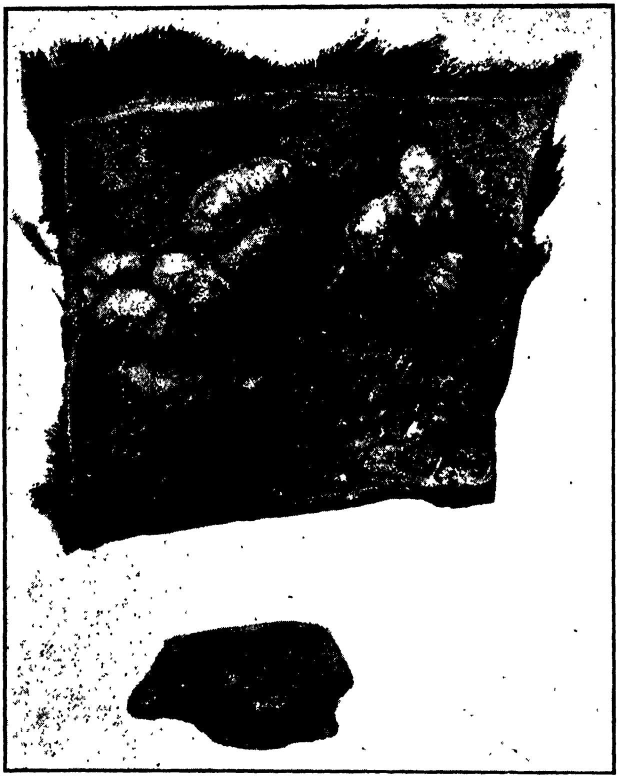


Fig. 21.—*Under-side of hide of Ox showing warble cysts, each of which contains a larva of* Hypoderma bovis. *In the lower figure a cyst has been opened to expose a larva.*

From nature. Reduced.

The length of time taken for the stages of the larva in the back is about ten weeks, perhaps a little shorter, but it can be longer according to weather and other conditions. It is during this period that the larvæ can be dressed for destruction, though for a time after first appearance, the hole in the skin is too small to allow of sure entry of the dressing.

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[1] 'Parasites,' by Geoffrey Lepage. Benn.

Position of Larvæ in their last stage.—The great majority of the warbles are found in the region along the back from just behind the shoulder to the hook bone, in two strips eight or nine inches broad. Each strip begins from two to three inches on each side of the middle line of the back or backbone, and extends laterally for seven to eight inches. This is the region where the larvæ are most likely to escape crushing by the warbled animal. Some warbles, however, are found behind the hook bones, on the rump and down the flanks, and others in front of the shoulders. In cows or cattle in good condition, one may find warbles well down the ribs on each side. Occasionally one gets larvæ right in the middle line, above the spinal cord.

Incidentally an interesting point may be noted here. In some way the notion has got about that warble larvæ are more common on one side of the animal than on the other. I have heard this put as a question to a candidate in an oral at a professional examination. This notion was mentioned to our workers in Scotland without any definite request to keep a record. In some cases, however, it proved convenient to keep such a record, and I quote the results here :—

Workers.	Total Warbles.	Larvæ on right side.	Larvæ on left side.
Mr Halcrow, Mr Gillies and Mr Bruce .	1413	649	764
Mr Stevenson . .	309	158	151
Mr Turner . .	2264	1158	1106
Mr Donald . .	710	339	371
	4696	2304	2392

There is no month in the year in Scotland in which Hypoderma larvæ cannot be obtained under the skin of cattle if one has access in an abattoir to the hides of slaughtered animals. But in the open fields it is from February till towards the end of May that the presence of the larvæ under the skin of the back is easy to tell by touch and by the eye. In January, June and July one can also find examples in the living animal. The numbers decline as the summer progresses. Here and there throughout July larvæ can be found. On August 9 I removed a larva for examination; it proved to be the larva of *H. bovis* soon after its moult from the second last stage.

The full-grown larva, with tough outer covering and bands of spines, presses itself out of the opening in the skin, an act which requires considerable muscular exertion, and drops to the ground. The larva dislikes the light and proceeds to move—the movement is slow (no legs are present)—out of the light, passing under cover of litter or entering the surface layer of the soil. In such shelter-place the larva, after a short quiescent period, moults. The moulted skin is not thrown away, but, turning hard and becoming black, it remains as a protecting case or puparium under cover of which the changes take place which result in the perfecting of the adult fly. By six weeks the fly may be ready, at the head end a circular portion of the puparium is pushed off (Fig. 15), the fly appears in the open; its wings slowly expand and the other parts dry and harden, and on the same day, it may be, the insect finds a mate and pairs.

Warble flies are not long lived, as would be expected, since they do not feed.

DISTRIBUTION OF WARBLE FLY LARVÆ IN SCOTLAND.

The larvæ of both species are common in Scotland. Records from my notes show that Hypoderma larvæ may be found from Shetland to Wigtown.

It is not unimportant to know which species is at work, or if both species be present, because *H. lineatum* appears, as adult, earlier in the summer, and in the next spring the larvæ of this species are mature earlier. If it were proved that only one of the two species was present in an area, it might be possible to have one dressing less in our procedure against the larvæ.

In the 1930 experiments—April, May, June—the earlier development of *H. lineatum* is brought out, as in the following table, compiled from the records of the different experimental areas :—

Date of Examination.	*H. lineatum.*	*H. bovis.*
April 1 to 6	882	24
April 6 to 21	1158	73
April 22 to 30	283	205
May 1 to 10	109	208
May 11 to 24	53	56
May 25 to 31	18	217
June 1 to 12	3 (on June 3)	137
June 13 to 16	0	7
June 23	0	1
June 25	0	2

The table, with dates for the species, just quoted, confirms what we found in our Scottish experiments undertaken in 1923 for the Departmental Committee,[1] that in the beginning of the warble season the larvæ of *H. lineatum* are the first to mature; then as the *H. lineatum* numbers begin to fall off those of *H. bovis* rise; then *H. lineatum* larvæ fail and only *H. bovis* are found. In 1923 our record was :—

Date of Examination.	*H. lineatum.*	*H. bovis.*
March 10	99	0
March 12 to 20	246	0
March 22 to 31	378	0
April 1 to 6	185	1
April 6 to 21	484	85
April 22 to 30	136	272
May 1 to 10	77	209
May 11 to 24	16	345
May 25 to 31	0	74
June 1	3	0
June 2 to 9	0	28

There is overlapping of the flight periods of the two species of warble fly and also some variation. For example, in one season I obtained second last stage larvæ of *H. lineatum* from 2nd March right through April and on to 18th May, while throughout April and May I was also getting second last stage larvæ of *bovis*. Roughly, however, one may, in a favourable year for the flies, expect *lineatum* in flight even in May, while *bovis* comes later (Fig. 22).

HARM AND LOSS DUE TO WARBLE FLIES.

The excitement caused in cattle by the presence of the fly, and the gadding, tire animals and interfere with their feeding. There is loss of feeding-time, too, in cases where cattle have access to water, into which they wade and remain for considerable periods.

Where milk-cattle are excited and run, the milk suffers in quality and quantity.

Excitement and over-exertion may cause abortion in in-calf cows.

There is some pain attending the boring into the skin of the newly hatched larvæ.

There must be attendant discomfort when the gullet harbours a large number of larvæ, and the later migration of many larvæ to the back cannot be altogether innocent of discomfort.

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[1] 'Report of the Departmental Committee on the Warble Fly Pest.' Ministry of Agriculture and Fisheries. Published by His Majesty's Stationery Office, 1926.

The presence of a large number of larvæ in the sub-dermal tissues interferes with condition.

Where the warbles are in fair numbers there is tenderness along the back, and the animals resent any interference.

When the holes are cut to the outside by the third last stage larvæ bacteria may enter and the warble-chamber may get full of pus; abscesses form and lead to unthriftiness.

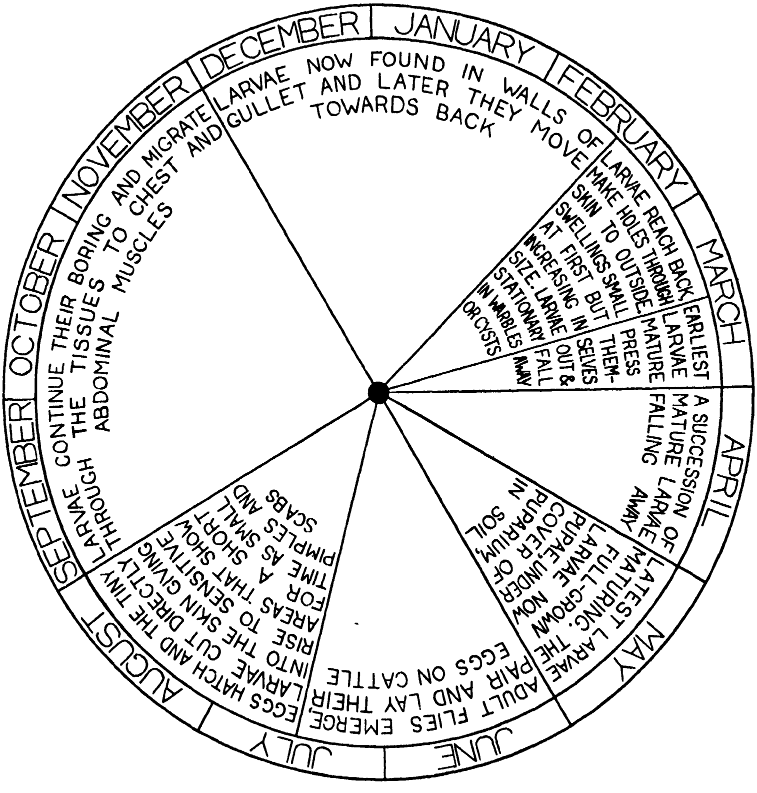
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER
LARVAE NOW FOUND IN WALLS OF GULLET AND LATER THEY MOVE TOWARDS BACK
LARVAE REACH BACK, MAKE HOLES THROUGH SKIN TO OUTSIDE. SWELLINGS SMALL AT FIRST BUT INCREASING IN SIZE. LARVAE STATIONARY IN WARBLES OR CYSTS
EARLIEST LARVAE MATURE PRESS THEMSELVES OUT & FALL AWAY
A SUCCESSION OF MATURE LARVAE FALLING AWAY
LATEST LARVAE MATURING. THE FULL-GROWN LARVAE NOW PUPAE, UNDER COVER OF PUPARIUM, IN SOIL
ADULT FLIES EMERGE, PAIR AND LAY THEIR EGGS ON CATTLE
EGGS HATCH AND THE TINY LARVAE CUT DIRECTLY INTO THE SKIN GIVING RISE TO SENSITIVE AREAS THAT SHOW FOR A SHORT TIME AS SMALL PIMPLES AND SCABS
LARVAE CONTINUE THEIR BORING AND MIGRATE THROUGH THE TISSUES TO CHEST AND ABDOMINAL MUSCLES

Fig. 22.—*A general Calendar regarding* Hypoderma lineatum *in the round of the year.*

Drawn by Dr J. N. Oldham.

There is considerable money loss extending to a penny per lb. per hide in the case of badly warbled hides. A loss of 5s. on a 60 lb. hide represents, in view of the large percentage of warbled hides that pass through the various markets, a large money wastage.

The butcher suffers in a further way, for after the cattle have been slaughtered there is wastage in dressing the carcase of a warbled beast. The warble fly larvæ in the subcutaneous tissue set up inflammation extending to the connective tissue, and the result is a straw-coloured jelly-like stuff—a common name for it is butcher's jelly—which has to be scraped away in preparing the carcase. The cut-away parts, unfit for food, represent waste and loss.

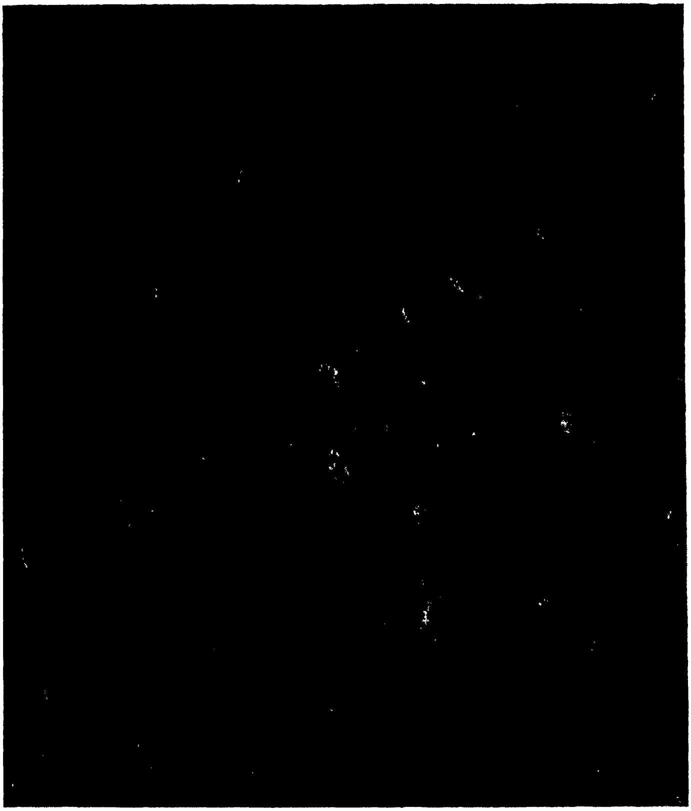

Fig. 23.—*A small piece of leather from a hide that had been warbled.*
Natural size. The holes in the leather are evident enough.

Mr John A. Sinclair, a member of the Leathersellers' Company's Warble Fly Committee and the Highland and Agricultural Society's Committee, and representing the Scottish Federation of Meat Traders' Association, wrote to me as follows: "In a badly warbled animal there is serious loss due to damage to the most valuable part of the carcase, When the hide is removed the back of the animal is covered with a congealed mass of watery matter, yellowish in colour. When this is removed the back of the sirloin is left almost bare, and the value of it is greatly reduced. Although the animal may have been of first-grade quality, the badly warbled parts are sold in the Dead Meat Markets at a price considerably lower than the value of clear beef. It is very difficult to mature such beef, for if kept for the usual time it will not please the eye of the customer, as when dry the surface of the affected part has a greenish tinge."

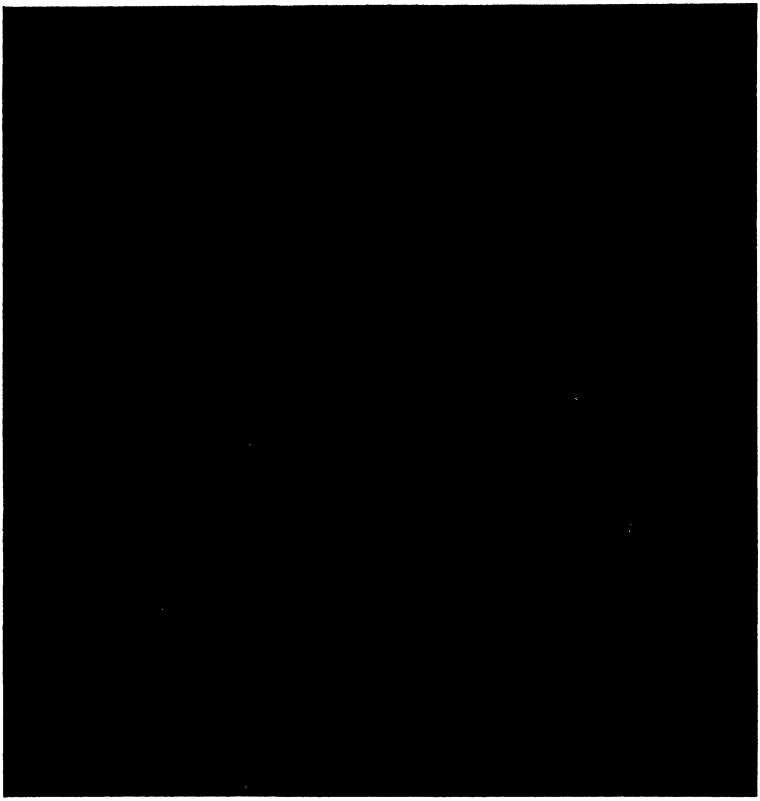

Fig. 24.—*Piece of leather from tanned hide that had been warbled. The skin had had time to heal before the animal was slaughtered, but spot or pitlike marks remain revealing the healed-over places.*

Lastly, there is the great annual loss from hides spoiled or ruined for tanning purposes and for leather (Fig. 23).

A question often repeated is, "Will a warble hole from which a larva has pressed itself out, heal up in time and leave no mark when the beast comes to be killed?" In answer, Fig. 24 is of a small portion of leather from a hide that had been warbled, but where, before the warbled animal was slaughtered, and the hide tanned, there had been time for healing. Although the holes had healed over, the prepared leather shows a pitting or spotting, easily recognisable. Leather with such marks cannot be used in the finest work, and brings a lower price in the market.

The term 'Blind Warble' is in use by hide merchants and by Inspectors who have to examine hides and grade them. A blind warble no longer shows the larva in its cyst in the hide. The larva having completed its growth has fallen away and there has not been time enough for a complete healing. A scar remains, or a dark blue spot is present, marking the position where a larva had been. A hide with blind warbles is not passed as clear by the Inspector but ranks as a warbled hide.

A general idea may be formed of the incidence of warble, in a single market, from the percentages given me by Mr T. J. Macpherson, a member of Committee representing the Scottish Hide Inspection and Improvement Federation.

Percentage of warbled hides in *all* classes of hides in the Edinburgh market in 1931:—

March . .	50%	June . .	64%
April . .	62%	July . .	63%
May . .	66%	August . .	58%
		September .	54½%

WARBLED HIDES, EDINBURGH MARKET FROM MARCH TO SEPTEMBER 1931.

	1ST A. Clear.	1ST B. Warbled.	2ND. Warbled.	3RD. Warbled and other damage.
March . .	1403	1,106	786	194
April . .	1073	1,472	1300	348
May . . .	688	1,235	1164	248
June . . .	822	1,245	1079	159
July . . .	1101	1,726	1115	69
August . .	1210	1,656	443	10
September . .	1370	1,683	304	5
	7667	10,123	6191	1033

For the understanding of the figures it has to be explained that in the Scottish markets the hides are graded as First Class, Second Class and Third Class.

The Firsts are further subdivided into First Class Clear (known as 1st A.) where the hide is warble free, and First Class Warbled (known as 1st B.) where the warbles do not number more than four. The Seconds are hides with five to fifteen warbles. A hide with more than fifteen warbles is a Third.

Immunity.—Are some animals immune ? This is a question that might repay study. It is certainly the case that some animals escape the attention of the warble fly; or if eggs be laid on them the maggots that hatch do not come to maturity.

In the 1931 work we had examples of animals running together some of which were warbled, while the others remained free from warble. The animals noted as free from warble in 1931 had also been free in 1930, whilst their neighbours were warbled in both years.

Is the presence of smaller numbers of warbles in older animals due to earlier attacks conferring some protection ?

ANIMAL COLOURATION AND WARBLE FLY ATTACK.

Darwin suggested that flies (no species were named) attacked white cattle more than dark cattle. Dr Hadwen inclines to Darwin's view and has given some evidence in favour of it. Cattlemen in conversation with me at different times have expressed the opinion that when flies (no species named) are about they follow up white cattle in preference to others. In a Report for 1929 from the Bureau of Animal Industry, Washington, this statement is made in reference to warble flies : "It appears that light-coloured cattle are more heavily infested than dark cattle." On the other hand, the above view is disputed. In a Paper reviewed in the 'Review of Applied Entomology,' concerning the bionomics of *Hypoderma bovis*, it is stated that "animals of various classes were equally attacked, no preference being shown for light-coloured individuals."

With so many skilled men at work and with so many cattle being handled I thought it might be possible to obtain some evidence as regards colour. Therefore, in the various areas my colleagues were asked to make such observations as they could.

Dumfriesshire.

Mr Robert Bruce, B.Sc., made special notes in his 1930 work. The following were Mr Bruce's findings in 1930 in his work at Breconside, Dumfriesshire :—

Group I.—12 Galloway cows (*i.e.*, black cows) and 1 white bull were grazed together all summer. The 12 cows had 34 warbles, average 2·8 ; the 1 white bull had 8 warbles.

Group II.—7 2-year-olds and 11 cows (all black Galloways)

—*i.e.*, 18 animals altogether—had 91 warbles, average 5 per animal. Grazing with this group were 2 light-coloured animals, which had 22 and 16 warbles respectively.

Group III.—7 cross 2-year-olds, light-coloured, had 93 warbles, average 13·3. This average of 13·3 was much higher than in any other group containing black cattle.

Mr Bruce's results at Dormont, Dumfriesshire, in 1930 and 1931 suggested that light-coloured animals were more heavily infested than black ones.

Kirkcudbright.

Mr Philip Teare had these figures :—

Cattle examined.	Free.	Warbled.
662	237	425

which, grouped in two divisions, gave—

Light-Coloured.

Free.	Warbled.
201	373

i.e., of 574 light-coloured cattle 35 per cent were free and 65 per cent warbled.

Dark-Coloured.

Free.	Warbled.
36	52

i.e., of 88 dark-coloured cattle 40 per cent were free and 60 per cent warbled.

Roxburgh, Selkirk and Berwickshire.

Mr J. O. S. Miller reported as regards colour—

Number of cattle examined	311
Dark cattle free from warbles	233
Dark cattle warbled	49
White cattle free	26[1]
White cattle warbled	3

Mid-Lothian.

Mr J. R. Raeburn's observations are arranged in two Tables—

Colour of Coat.

Colour.	Number of Animals.	Number of Warbles.	Average number of Warbles per Animal.
Roan[1] . . .	35	368	10·51
White. . . .	9	74	8·0
Red	23	163	7·0
Blue-grey . .	2	13	7·0
Black and white	3	22	7·0
Black	32	204	6·4
Red and white .	38	159	4·0

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[1] Some of these were Ayrshires, almost white.

Colour of Legs.

Colour.	Number of Animals.	Number of Warbles.	Average number of Warbles per Animal.
Roan[1] . . .	21	248	11·8
White. . . .	30	200	6·7
Red	29	235	8·0
Red and white .	11	92	8·4
Black	36	219	6·0

Perthshire, Clackmannan, Kinross.

Mr Arthur Hutcheson's percentages were as follows :—

White cattle warbled . . .	26·1 per cent.
Brown and white warbled . .	11·8 ,,
Brown warbled	14·0 ,,
Black and white warbled . .	25·0 ,,
Black warbled	16·85 ,,

CONTROL.

The Prevention of Egg-laying.—The Departmental Committee had experiments with various sprays and dressings, the aim being to get some dressing or spray so disagreeable to the flies as to repel or deter them from laying their eggs on the cattle. For the Departmental Committee we had experiments on two farms (one in East Lothian and one in Aberdeenshire), with birch tar-oil, but no recommendation could be given.[2] The dressing was very sticky and rendered the animals unsightly ; further, it took a long time to apply, and the repetition necessary made it unpractical, although it was not without effect as a repellent to flies. A successful repellent must not only repel but must be easy to apply, must persist in the deterrent condition for a fair length of time, must not hurt the animal and must not be costly in itself or for labour necessary.

In the United States cattle have been made to wade frequently through a vat containing an arsenical solution or a 2 per cent coal-tar creosote solution, the aim being to reduce or destroy the percentage of eggs laid low down on the legs. So far as such experiments have gone the method has not proved satisfactory. No experiments of this kind were attempted by the Committee.

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[1] Roans might better have been named light or white roans ; though reddish-looking some distance away yet they appeared more and more white as one approached and reached them.

[2] "Report of the Departmental Committee on Warble Fly Pest." Ministry of Agriculture and Fisheries. Published in 1926 by His Majesty's Stationery Office.

Extraction of the Larvæ from the Back.

Squeezing out larvæ as they lie in the back is the soundest annihilative measure if it be possible to have it done thoroughly. There are instances where, in isolated areas, this method has resulted in complete disappearance of the pest. The squeezing out is done by the thumb and forefinger of both hands (Fig. 25).

Removal of larvæ is easiest in animals with more elastic skins and looser or slack skins.

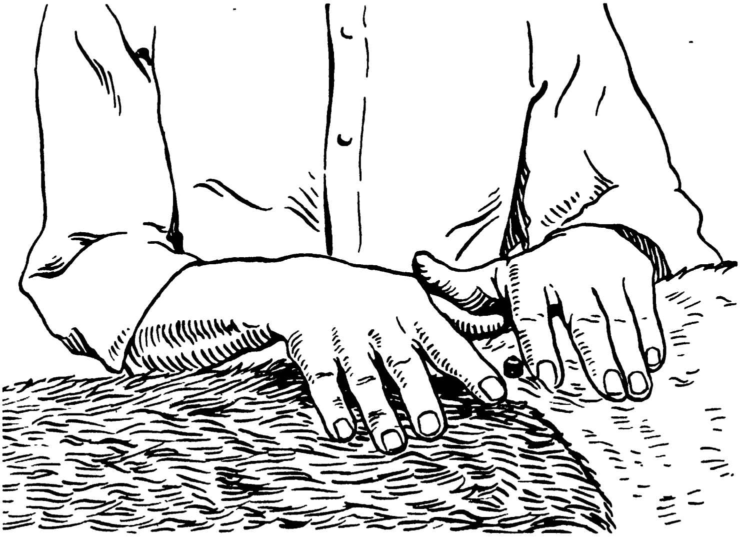

Fig. 25.—*Squeezing out Warble Fly larvæ by pressure of fingers.*

From "Cattle Grubs or Steel Flies, with Suggestions for their Control," Farmers' Bulletin 1596, United States Department of Agriculture.

In practising a periodical squeezing out of larvæ as an annihilative measure the first treatment should be as soon as the swellings are prominent and the enclosed maggots well on their way to the end of their growth—on an average not later than the middle of March. In some places and seasons it could be even earlier.

To get over some of the difficulties of pressing the larvæ out by the fingers and as a saving in time mechanical devices have been resorted to.

Forceps.—In the United States the use of forceps has been found of considerable service in the extracting of warble fly larvæ from animals whose inelastic skins made pressure by the fingers difficult or unsuccessful. The forceps used were artery forceps with slender curved tips (Fig. 26). "The nose or tip of the forceps is easily introduced into the hole and then spread quickly, thus stretching the hole. Then as the end of the grub is gradually squeezed out, it is grasped by

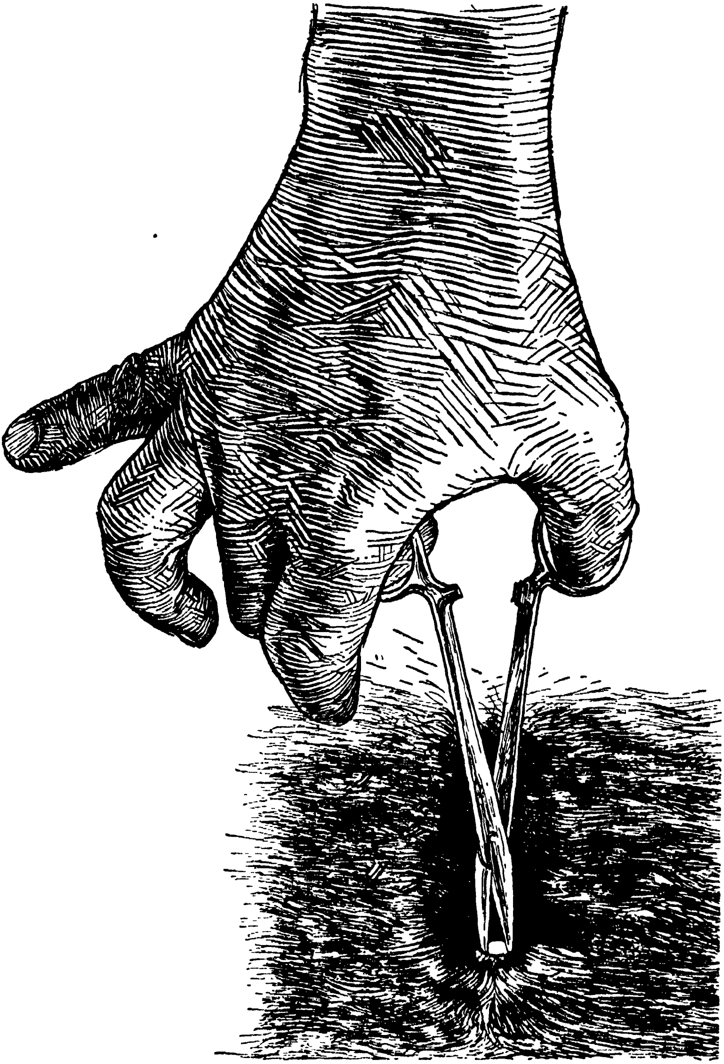

Fig. 26.—*Removal of Warble Fly larva by means of artery forceps.*

From "Cattle Grubs or Steel Flies, with Suggestions for their Control," Farmers' Bulletin 1596, United States Department of Agriculture.

the forceps and pulled gently, to supplement the squeezing. This simple instrument reduces the time of extraction by half, and makes extraction possible in the most difficult cases."

A great deal of attention has been given on the Continent—*e.g.*, in Germany and Denmark—to mechanical means of removal of the larvæ from the back. Forceps are not equally serviceable in all types of animal. Extraction by means of a pin bent at the point into the form of a hook has received considerable approval. A pin is fitted into a wooden holder; the tip is bent round to form a hook. The pin is laid down sideways on the larvæ and then turned so as to pierce the larva, which is then drawn out. Forceps may be brought into play when the larva has been drawn out a little way.

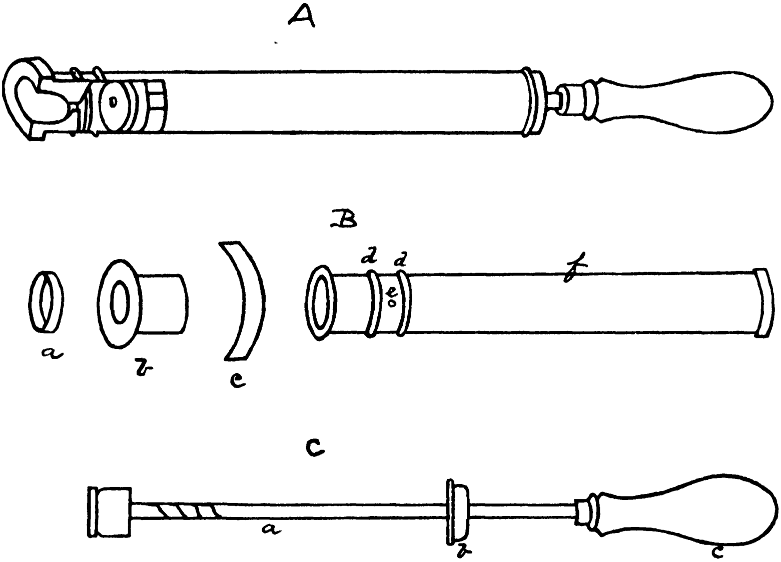

Fig. 27.—*Warble larval suction-extractor pump* (*Brodersen's*).

A. Pump assembled.
B and *C*. Parts of the pump.
B a. Rubber-band for pressure valve
b. Rubber suction bell or cup.
c. Rubber band for suction valve.
B d. Ridges on outside of brass cylinder.
c. Hole for pressure valve.
f. Brass cylinder.
C a. Piston-rod; *b*. Screw cap; *c*. Handle.

The Suction Pump.—Some years ago, in Denmark, Dr L. Brodersen, in collaboration with Engineer Steppinge of Copenhagen, devised a pump for the extraction of warble fly larvæ. The Brodersen pump suggests in external appearance a garden syringe (Fig. 27A). It measures a foot in length, and with the piston-rod extended nearly 2½ feet. The width of the rubber bell at the opposite end from the handle is 1½ inches. The cylinder is of brass, and encloses a piston-rod (Fig. 27C) with wooden handle. At the lower end of the pump is a suction bell of rubber (Fig. 27B *b*) slightly countersunk so as to fix over the warble lump. The space inside the suction bell is large enough to take up the larvæ and pus. From the top of the suction rubber bell a small hole (Fig. 27A and Fig. 28) leads to the pump tube. Across this hole is laid a small rubber ribbon (a cut-through elastic band does very well), whose loose ends are secured by the suction bell, being caught between the upper part of the rubber bell and the brass cylinder, when the rubber bell is pushed home into position. This acts as an air-tight plug in the lower end of the pump tube. The rubber band or ribbon forming the suction valve acts as a check valve, allowing air to be drawn from the suction bell when the piston is drawn up, but prevents the passage of air when the piston is pushed down. Such air escapes through a little pressure valve—viz., a small hole on the side of the pump cylinder (Fig. 27B *e* and Fig. 28). This hole is covered by a rubber band which is fitted round the outside of the brass cylinder between the ridges (Fig. 27B *d* and *d*). This rubber band should fit closely, so that suction may act. By aid of these valves it is possible by several strokes of the piston to clear the space in the suction bell and to increase the suction effect of the pump.

Before use of the pump the swellings on the animal's back should be washed with soapy water to remove scab or pus from the hole in the skin. Then apply the suction bell over the swelling and the hole, and press down firmly with the left hand. Next draw out the piston-rod quickly with the right hand, and listen for a moment for the 'plunk' made inside the bell by the sucked-out larva. If no such sound is heard, give one or two more strokes of the piston. When the edges of the rubber suction bell (Fig. 28) are pressed down on the hide an air-tight joint results. On the piston-rod being raised the check valve rises and a strong vacuum is formed in the bell, extracting the larva. Air cannot return and destroy the vacuum owing to the valve. In emptying the cylinder tube of air in preparation for a fresh stroke, the piston is pushed down and the air escapes through the opening at the valve formed by the rubber band round the outside of the brass barrel or cylinder.

Tests with the Brodersen suction pump gave uneven results. On smooth-skinned animals, and where the larvæ had reached a stage when the hole in the skin was large, one got more than fair results. The worker requires to be an averagely tall man.

It is claimed—we have not tested this—that healing takes place more quickly when larvæ are so sucked out than in the cases where larvæ have emerged naturally and spontaneously, perhaps because pus and excrement are also sucked away with the larvæ.

The pump costs 10s. 6d. It is a neat and ingenious instrument, and one would have liked to praise it unreservedly.

In our experiments the practice was to extract the warble larvæ some days after treatment and examine them to report the result of the dressing and often to determine whether we were dealing with *H. lineatum* or *H. bovis.* This would not, of course, be necessary in ordinary practice where the farmer was dressing his beasts for warble, but ours was a scientific experiment where, if numbers were to be compared and

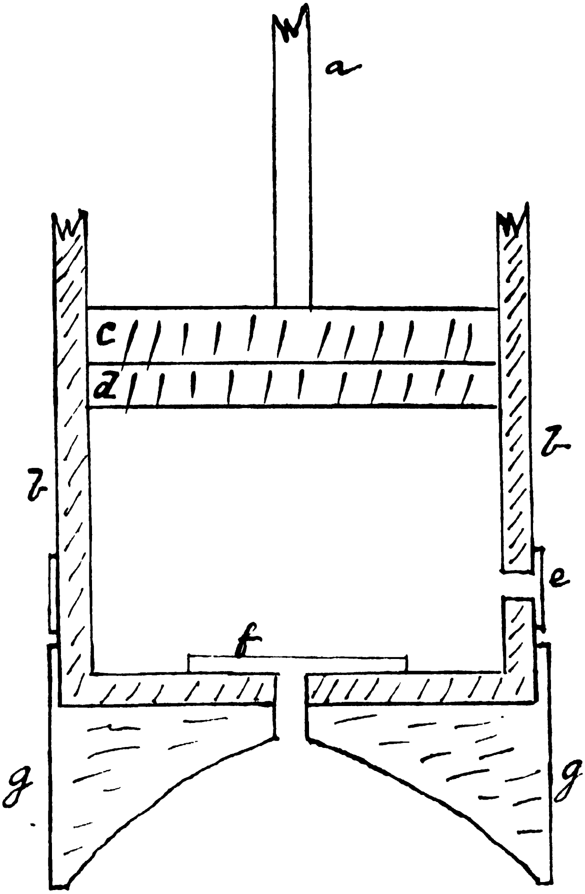

Fig. 28.—*Section through lower end of Brodersen's suction-extractor pump.*

Magnified.

a. Piston-rod.
b. Brass cylinder or barrel for piston-rod.
c. Washer.
d. Brass piston.
e. Rubber band acting as exhaust valve.
f. Rubber band as valve acting as check.
g. Rubber suction bell.

percentages struck, one dare not take things for granted. As the experiments went on we expected, of course, that the Derris dressing would do its work, but there were variations sometimes explainable, sometimes puzzling.

In our 1923 experiments a wooden tool had been used as an aid in extraction. In spring 1931, Mr John R. Raeburn, B.Sc., made such a tool from specifications which were supplied by Mr Arthur Wannop, who at that time was County Organiser in Agriculture for Roxburgh. Mr Raeburn shaped the tool from a small block of oak wood (Fig. 29) and used the tool freely and successfully in the 1931 experiments in Mid-Lothian and East Lothian. Roughly the block measured 6 in. × 2¾ in. × 1¾ in. The final form of the tool can be seen in the drawing. The lower end of the tool was scooped out to form a cup or chamber. In use, the hollowed-out or cup-like end was placed over the open hole in the swelling, with the hole in the skin in or about the centre of the cup. The rim of the cup forms a circle round the warble. Pressure is then applied, both hands being used, on the handle of the tool. Mr Raeburn reported very favourably of this wooden instrument. By its means about 90 per cent of the larvæ treated by him were pressed out. The pressed-out larva was caught in the cup. Sometimes, owing to hard pressure, the bullock winced, but no harm was done. The tool proved especially useful with restless animals. By means of the tool, ripe or nearly ripe larvæ were easily pressed out. Larvæ situated near the backbone, or on the loin edge, yielded easily to the pressure of the tool, but larvæ on the sides of the ribs or below the loin edge were more readily pressed out by the fingers.

The inside of the cup should be polished smooth in making the tool, and, of course, the cup must be kept clean and disinfected regularly.

THE APPLICATION OF DRESSINGS FOR DESTRUCTION OF THE WARBLE LARVÆ IN THE BACK.

The squeezing out of the larvæ as a method of control has as one of its disadvantages the constant interference with and handling of the stock (in a general campaign with continued effort the work would of course gradually become less onerous on account of the mass destruction of larvæ), and in view of practical difficulties an alternative treatment is offered—namely, the dressing of the larvæ in the back with some substance which will kill it and so prevent a new generation of flies and a new egg-laying. Many substances if applied to warbles will kill the larva, but the killing agent must not only be successful against the larva, it must also be harmless to the cattle and the hide, be painless, in repeated use, to the workers, give no trouble in preparing, must be easy to apply and be cheap. The Departmental Committee as a result of experiments in

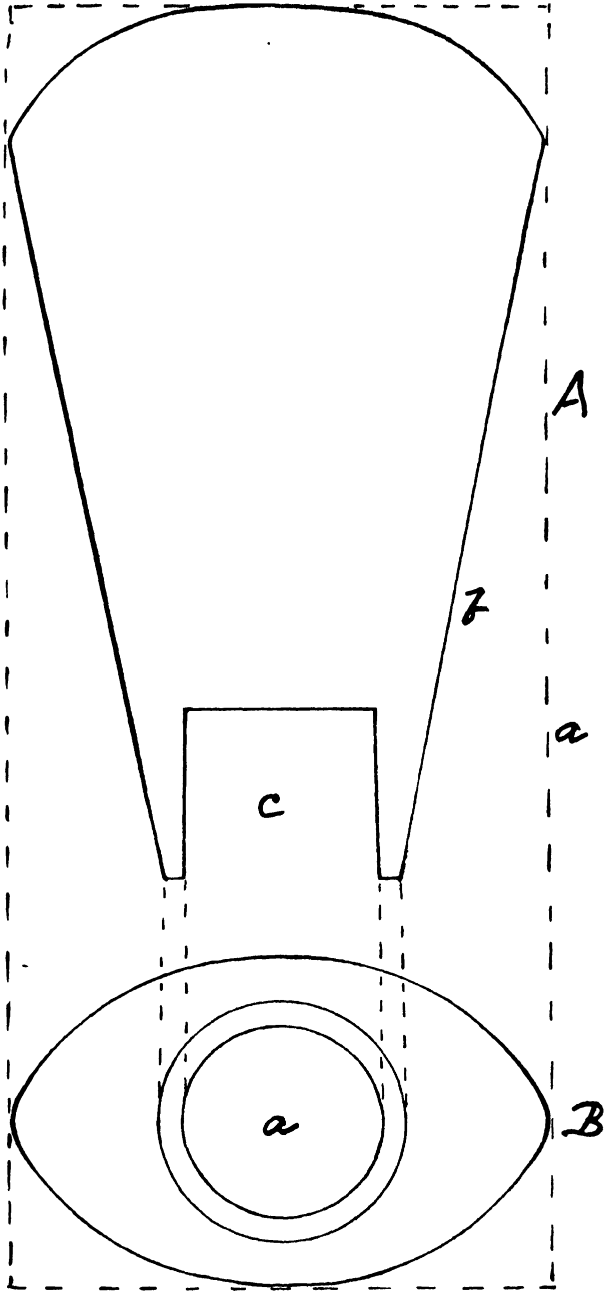

Fig. 29.

A. The wooden tool for pressure. *a*. Outline of block of wood from which the tool was cut. *b*. Outline of tool in longitudinal section. *c*. The hollowed-out cup in which pressed-out larva is caught.

B. Lower end of block of wood in transverse section. *a*. The cup in which pressed-out larva is caught, in transverse section.

Ireland, by Carpenter, and in Scotland[1] (mainly in East Lothian where the chief workers were Dr J. N. Oldham, Mr T. Gibson, B.Sc., Mr T. C. Cairns, B.Sc., and Dr Ian Galloway), recommended certain dressings, and amongst them Derris Powder, which not only had proved a successful killing agent but was easy to transport and easy to handle.

The Derris Powder preparation[2] was received from M'Dougall, Robertson & Co., and the experiments with it were done in East Lothian, Berwickshire and Mid-Lothian in 1923 for the Departmental Committee. The Derris Powder was applied in two strengths—viz., 1 ounce of the powder to a pint of water and 1 ounce of the powder to a quart of water.

Aware of the poisonous principle in Derris root, and having read of it as one of the Malay and Borneo arrow-poisons, I was anxious concerning its effect on cattle. I was fortunate to have the services of Dr Ian Galloway, M.R.C.V.S. The work was done very thoroughly, pulse, temperature, respiration being taken before and after the dressing. No harm resulted to the treated cattle. It may be interesting to quote in detail these 1923 experiments.[3]

EXPERIMENT A.—ONE OUNCE OF DERRIS POWDER TO A QUART OF WATER.

Farm.	Dressing applied by	Days between Dressing and Examination.	Number of Warbles Dressed.	Number of Larvæ killed.
A 14 . . .	Syringe	3	26	23
A 1 . . .	,,	3	35	32
X 1 . . .	,,	3	4	3
X 2 . . .	,,	3	14	8
No. 1 . .	Cloth	5	10	6
No. 2 . .	,,	5	5	5
No. 3 . .	,,	5	1	1
Cow No. 57 .	Syringe	3	4	4
Brunstane . .	,,	3	21	20
Ecklaw . .	,,	3	27	26
Braxton . .	,,	3	19	18
Lawfield . .	,,	3	31	31
Burnieknowe .	,,	3	106	97
Chapel Hill .	,,	3	96	73
Stoneypath .	,,	3	41	31
		Total .	440	378
		Percentage killed, 85 per cent.		

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[1] Report already cited as published by His Majesty's Stationery Office.

[2] A preparation of Derris or Tuba Root had been used in the United States. Formula for Dressing: Ground Derris Root, 1 lb.; soap, 4 oz.; water, 1 U.S. gallon. Wells, Bishopp and Locke in the 'Journal of Economic Entomology.' Vol. xv., 1922.

[3] "The Ox Warble Flies," by R. Stewart MacDougall, in 'The Scottish Journal of Agriculture.' January 1924.

EXPERIMENT B.—ONE OUNCE OF DERRIS POWDER TO A QUART OF WATER.[1]

Farm.	Dressing applied by	Days between Dressing and Examination.	Number of Warbles Dressed.	Number of Larvæ killed.
D 7 . . .	Syringe	3	32	31
D 10 . . .	,,	4	58	55
X 1 . . .	,,	3	7	7
X 2 . . .	,,	3	5	5
Bonnyrigg . .	,,	3	10	9
Cow No. 42 .	,,	3	14	13
Humbie Mains .	,,	3	29	27
Blegbie . .	,,	3	13	12
Windymains .	,,	4	17	17
Upper Keith .	,,	3	10	10
Leaston . .	,,	3	43	42
Brighthouse .	,,	3	14	14
Highbrae . .	,,	3	4	4
Whitburgh . .	,,	3	49	47
The Cove . .	,,	3	25	21
Home Farm Spott	,,	3	88	87
West Broomhouse	,,	3	19	19
Pathhead . .	,,	3	82	78
Ecklaw . .	,,	3	27	20
Longnewton .	,,	3	8	6
St Martin's House	,,	3	20	18
Under Bolton .	,,	3	40	33
		Total .	614	581
		Percentage killed, 94 per cent.		

Further experiments and testimony to the usefulness of Derris was forthcoming from Dr C. L. Walton,[2] and in the Ox Warble Fly Report[3] on the demonstration and experiments carried out in Worcestershire in 1928 and 1929. This work attracted great attention and was a factor in the formation of the Leathersellers' Company's Warble Fly Committee. Two further Reports[4] detailing experimental work have been published. The Derris material used in the Worcestershire experiments was in the form of Polvo, a proprietary preparation provided by Cooper, M'Dougall & Robertson, Berkhamsted. The formula for use was: Derris, 1 lb.; Soft Soap, ¼ lb.; Water, 1 gallon.

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[1] 'The Scottish Journal of Agriculture.' January 1924.

[2] Dr C. L. Walton in 'Welsh Journal of Agriculture, 1925.' Vol. i., pp. 4 and 5.

[3] "Report on the Demonstration and Experiments carried out in Worcestershire in 1928 and 1929," by R. C. Gaut, M.Sc., N.D.A., County Agricultural Adviser, and C. L. Walton, M.Sc., Ph.D., Agricultural and Horticultural Research Station, Long Ashton, Bristol, with Introduction by F. P. Norbury.

[4] "Ox Warble Fly Report on the Demonstrations and Experiments, 1930," Worcestershire County Council Agricultural Education Sub-Committee, by R. C. Gaut, M.Sc., N.D.A., and "Report on the Demonstrations and Experiments, 1928-1931," by R. C. Gaut, M.Sc., N.D.A.

WHAT IS DERRIS?

Derris or Deguelin is a genus of plants belonging to the Order Leguminosae, and found in the Eastern Tropics. There are several species which contain, in their roots, poisonous principles, which can be extracted by treatment in various ways. In the olden days the roots were just beaten up and allowed to steep for a time, and then, with water added to the resulting milky fluid, the extract was used as a fish poison, or sprayed upon plants to destroy caterpillars; or the tips of arrows were coated (in Malay and Borneo) with the milky fluid in order to render them poisonous. In the Tropics of South America there are leguminous plants allied to Derris with similar poisonous properties. All these allied plants of the Eastern and Western Tropics have been known, for long, to have been the sources of fish poisons.

Derris is now being cultivated in quantity in the Malay Peninsula and in Sumatra, where 1000 lb. of dried roots can be got from an acre of Derris.

The chemical properties of Derris or *Deguelia elliptica*, known by the common name Tuba, have been studied at Rothamsted by Tattersfield and Roach,[1] and its insecticidal properties by Fryer and Stenton[2] at the Pathology Laboratory of the Ministry of Agriculture. Other species besides *elliptica* are valuable; the different species are being systematically studied in the East.

From the work of teams of chemists, biologists and physiologists we know that Derris roots contain several poisonous compounds—viz., Rotenone, Deguelin, Tephrosin and Toxicarol, of which Rotenone has far the most insecticidal value.

Two South American genera—viz., Lonchocarpus and Tephrosia, contain Rotenone. Some examples of Lonchocarpus have yielded a higher percentage of it than Derris; the common name for the plant is Cubé, and the product is known as Cubé Root.

American researchers in chemistry and entomology are at the moment keenly interested in the extract Rotenone, because in tests against certain insects it has been proved to act both as a *contact* insecticide and as a *stomach* poison. Economic Entomologists are always distinguishing between contact insecticides which are serviceable against sucking insects and stomach poisons which are fatal to insects that chew and swallow solid food materials. It is good, then, to think that it may be possible to reach a stage when, in the field as well as in the laboratory, one may be able to use a preparation of Rotenone effective in contact and as poison.

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[1] 'The Annals of Applied Biology,' Vol. x. No. 1. February 1923. Pp. 1-17.

[2] *Ibid.*, pp. 17-34.

Hitherto entomologists have relied on arsenical sprays as the most efficient of the stomach poisons. It would be a revolution indeed if arsenical sprays—*e.g.*, arsenate of lead—came to be displaced by a non-arsenical, like an extract of Derris. Roark [1] gives an impressive illustration of what such a change-over would mean to the United States, where 30,000,000 lb. of lead arsenate are used annually for spraying purposes.

One of the difficulties about Derris is the variation that exists in its Rotenone content, and Roark has reported on samples of Derris in which no Rotenone was present, although there were distinct percentages of Toxicarol, a compound very much inferior in insecticidal value. Derris preparations then from different sources may give results, in the practice, which appear inconsistent. One desires a standardised preparation with a guaranteed toxicity.

Rotenone, the most active insecticidal principle of Derris roots, is unstable in the presence of an alkali, and if there be free soap, of some kinds, then the extract may lose some of its potency. Further, Rotenone decomposes in certain solutions if allowed to remain exposed to the air.[2]

Because of these risks our workers were advised to use the Polvo Soft Soap dressing, *freshly made*. In 1930, in our work with the Polvo Soft Soap mixture, reports from more areas than one gave considerably lower percentages of 'kill' as compared with better results in the same area; and the only difference in the contrasting cases, revealed on inquiry, was that the Polvo Soft Soap mixture with the poorer results had been allowed to stand for some days after it had been made up.

IS THERE ANY RISK TO HEALTH IN THE USE OF DERRIS PREPARATIONS?

In all our experiments with Derris preparations the host animal has suffered no harm. I am familiar, too, with the extensive and safe use of Derris against lice on domesticated animals and against the mange or scab mites.

Human beings who handle the liquid mixtures or ointments do not suffer, but I have always warned the worker to be careful when the dry powder is being handled.

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[1] "The Insecticide Possibilities of Derris Root." By R. C. Roark, Chief of the Insecticide Division, Bureau of Chemistry, U.S. Department of Agriculture. In a Paper read before the Insecticide and Disinfectant Manufacturers' Association, New York.

[2] "Change in Toxicity of Rotenone in Solution and Suspension," by W. M. Davidson and H. A. Jones. 'Journal of Economic Entomology,' Vol. 24. Feb. 1931.

In making up the Polvo Soft Soap mixture, the powder has to be handled, and after its use a slight though distinct metallic-like taste in the mouth may be felt—a taste which persists for a quarter of an hour or so. Doubtless some of the very fine powder has been inhaled unconsciously.

Where one carelessly, or without thinking, inhales the powder when working with it, irritation of the throat and slight catarrh may follow. I have known the continued making up of the powder, in a dispensary, accompanied by unconscious inhalation of the powder, to result in headache and slight sickness. There is no real danger, but workers with the powder should be warned against possible discomfort. The warning is necessary because dry Derris in powdered form gains constantly in use in veterinary and other practice.

THE HIGHLAND AND AGRICULTURAL SOCIETY'S EXPERIMENTS IN 1930.

The general aims of the programme of experiments outlined to the Committee by the Entomologist to the Highland and Agricultural Society were—

(*a*) A mass test with the Polvo—*i.e.*, Derris Soft Soap preparation, which if successful could be recommended to the farmer as an efficient dressing. Such a success would stimulate interest and work in other counties of Scotland.

(*b*) Experimental tests of other dressings and a comparison of their efficiency.

(*c*) The elucidation of any points bearing on the life-cycle of the warble flies; with information that might lead to a knowledge of the number of dressings necessary and a more exact knowledge of the approximate dates for such dressings.

(*d*) The definite choice for experiment of so-called Breeding areas and Feeding areas.

By our term Feeding Area we mean an area where the farmer does not rear his own stock; where he may not have land to spare for grazing in the summer, but buys in cattle, perhaps to 'feed off' his own turnips and straw, as well as to feed as 'stores' for the market. In such areas there is a constant buying in of cattle from elsewhere, and often from areas where in a normal season warble infection is common. These areas, it was hoped, would provide the experimenters with material for a 'mass' testing of a dressing.

A Breeding Area, by way of contrast, is one where the farming is not predominantly arable, but where stock are reared to a considerable extent, and grazed where reared. Often such an area is fairly free of warble, but when warbles are present, the destruction of larvæ consistently practised must result in progressive diminution of the pest. With successful work in such areas we hoped to prove this reduction of pest in the following warble seasons.

In the choice of this second kind of area one tried to fix on a centre as isolated as possible from the chance of reinfection from warble flies migrating from elsewhere. We still require, however, more exact information as to the powers of flight of the Hypoderma flies.

Later the Form that follows was circulated as a help to keep the work more or less uniform, and at the same time assist somewhat in the work of analysis and comparison of the Reports from all over Scotland.

In this column in your Examination give a number or mark that will distinguish the animal.	Number or mark for Animal.
In this column state whether Bull, Cow, Calf, Heifer, Bullock.	Kind of Animal.
If possible always state the age.	Age.
The information in this column will give us some idea of the distribution of the Warble Flies.	Where grazed in 1930.
Number dressed.	Number of Warbles.
Date.	Date of Dressing.
Date.	Date of Examination.
Larvæ alive.	Alive.
Larvæ dead.	Dead.
In this column should come Notes on whether all the dressed larvæ were found, and note of any difficulty in settling dead or alive, and so on.	General Remarks.
For example.—Any high number of larvæ found on any one animal. Health of affected animal. Any fact that would be worthy of record.	General Information.

Reference to representative Tables that come later will give the reader a notion of the kind of record desired.

The dressings[1] tested in 1930 were Polvo Powder and Soft Soap; Cooper's Warble Fly Wash; an ointment; two Xylol Solutions.

The liquid dressings were applied in different ways. By syringe, by a cloth dipped in the dressing and squeezed over the warble hole, by a sponge, by a brush.

The type of syringe used was one with a stout nozzle, a syringe that would stand, it might be, rough handling, and with the nozzle of such a bore that it would not become easily choked with the powder. The workers themselves rather liked the syringe method, after some practice, as an economical and sure method, but apt to fail with a restive animal. Mr M'Intyre and Mr Kendall, after trying out various types of syringe, found a satisfactory one in a motor-cycle oil squirt with a brass barrel, obtainable from any motor agent for about two shillings. Mr Hutcheson, one of our workers in 1931, in Clackmannan, also found a motor-oil squirt efficient and economical. Mr Raeburn, in Mid-Lothian and East Lothian, had equal success with a motor-cycle grease gun, pump type, nozzle about $\frac{3}{16}$ inch. Always before using the syringe the entrance hole to the larvæ was cleared of whatever might have prevented the entry of the dressing.

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[1] The first three are Derris preparations supplied by Messrs Cooper, M'Dougall & Robertson. The Xylol Solutions for experiment and test were received from Messrs Harkness, Beaumont & Co. of Leith.

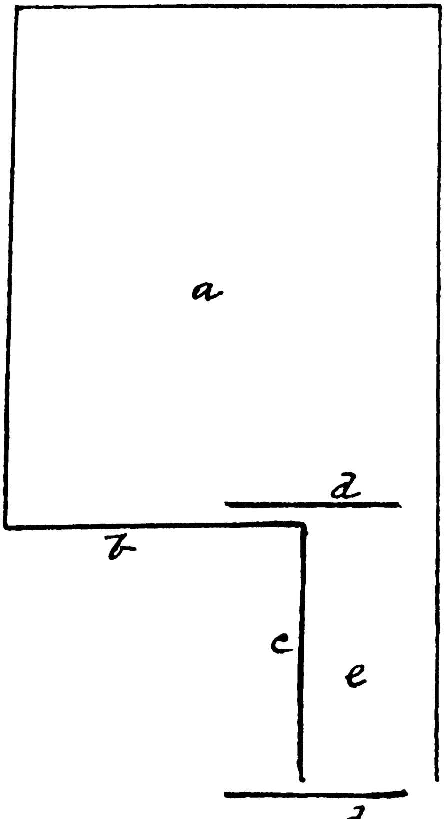

Fig. 30.—*A simple method for examination and dressing used in our experiments.*

a. Shed or close for collecting cattle. *b.* Gate or strong board. *c.* Gate. *d.* Movable gates. *e.* Place where animal is dressed.

In applying the dressing with a cloth, the cloth, after being dipped in the liquid, was pressed hard on the hide over the hole, a rotary or spiral movement being given at the same time. The rotary movement exposed the warble hole by removing any block or scab resulting from matted hair or dried exudate which might have formed over the entrance hole, a very common happening.

Both methods were quite efficient. Comparative tests

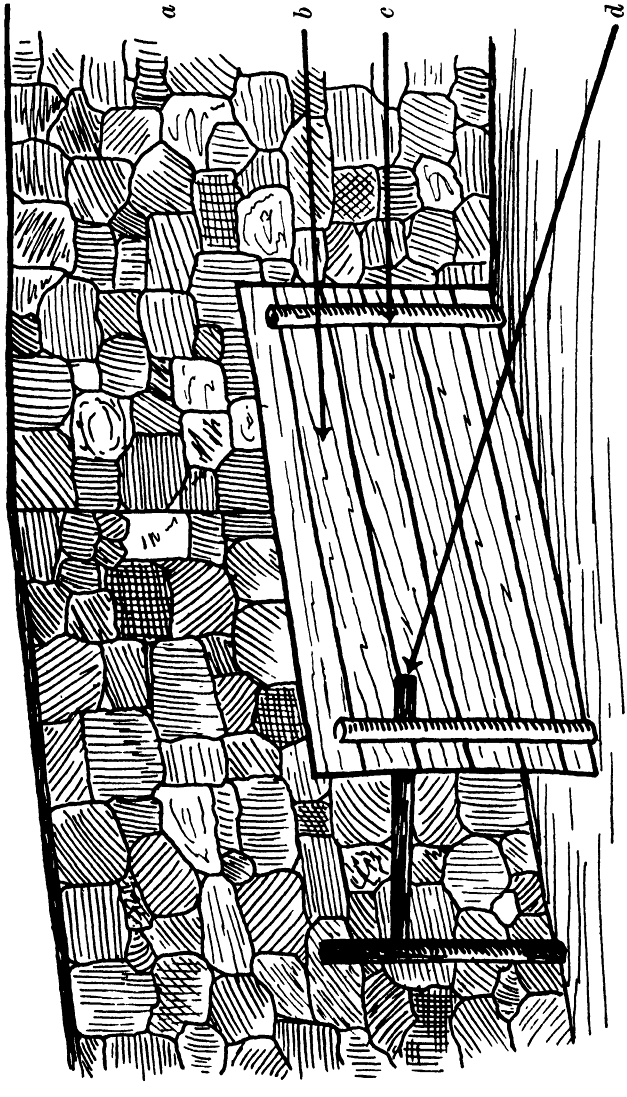

Fig. 31.—*Type of pen for use during dressing of warbled animals.*

From our East Lothian experiments in 1923 and 1924.

a. Wall. *b*. Old door or gate. *c*. Stob or stake. *d*. Iron or wooden bar pushed through gate.

by experienced workers showed little difference in this respect between them, though the syringe made for greater accuracy. Some workers preferred the wrung cloth method, others leaned to the syringe.

As explained earlier and as indicated in Fig. 22 larvæ reach maturity over a period of some months, and examination for the application of dressing, say on any one day, reveals differences

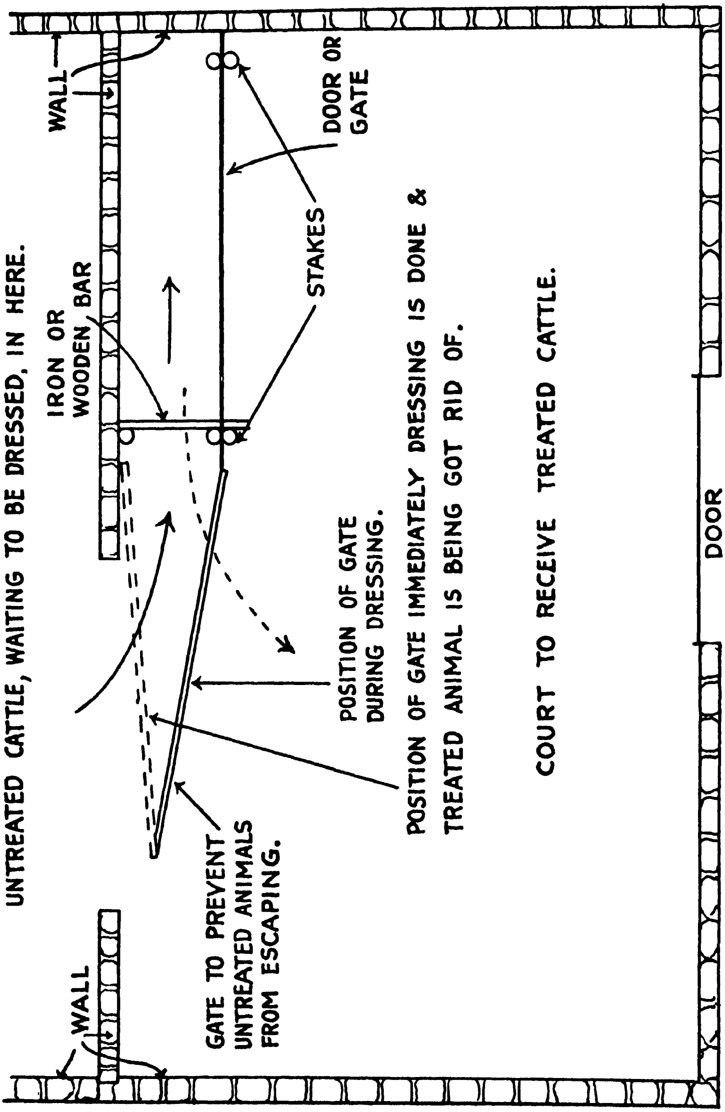
UNTREATED CATTLE, WAITING TO BE DRESSED, IN HERE.
WALL
IRON OR WOODEN BAR
DOOR OR GATE
STAKES
POSITION OF GATE DURING DRESSING.
POSITION OF GATE IMMEDIATELY DRESSING IS DONE & TREATED ANIMAL IS BEING GOT RID OF.
COURT TO RECEIVE TREATED CATTLE.
DOOR
GATE TO PREVENT UNTREATED ANIMALS FROM ESCAPING.
WALL

Fig. 32.—*Plan of an arrangement for examination and dressing of warbled cattle.*

From our East Lothian experiments in 1923 and 1924. Drawn by Dr J. N. Oldham.

in size of hole, corresponding to the development of the underlying maggot. The hole gradually increases in size. At one time of dressing the hole may be so small that there is doubt about the entry of the dressing ; the same hole ten days later may be quite conspicuous.

For examination and treatment the animals should be brought into a confined space or led through an alley.

At the time of our East Lothian experiments for the Departmental Committee I wrote that when dressing warbles became a regular practice some form of erection would be necessary into which the animals might be led for easy examination and treatment. Nothing elaborate is necessary.

Figs. 30, 31, 32 from our 1923 and 1924 experiments in East Lothian and Berwickshire will give some idea of arrangements that could be made to insure that the work of examining and dressing could be done with comfort and thoroughness. Excited animals in a cattle court need knowledgeable handling and can be a source of worry and delay. Examination and dressing in the open field—and you had to catch your beast first—was often not too easy. The 'racing and the chasing' that can be associated with repeated dressings, when conveniences like the above are absent, are against the stock. It is not so difficult, as a rule, to manage comfortably at a steading where a gate or some makeshift convenience is at hand. Dairy cows accustomed to handling are easy to examine and 'dress.'

EXPERIMENTAL AREAS IN 1930.

The experimental areas were as follow :—

Edinburgh and East of Scotland College of Agriculture.

County—Roxburgh.	*Colleagues.*
Ettrick and Yarrow. The two valleys of Ettrick and Yarrow in Roxburghshire. This served more or less as a 'breeding' area. Roxburgh district—the neighbourhood of the town. This district served as an area where imported stock could be found for experiment.	Arthur R. Wannop, B.Sc., County Organiser ; John Smart, B.Sc. (during April) ; J. A. Lindsay, B.Sc. ; J. O. S. Miller, E.D.A.

County—Perthshire.	*Colleagues.*
Aberfeldy area, as an isolated area. The area is an extensive one with many farms. Perth city and district as a 'feeding' area.	J. C. F. M'Intyre, B.Sc., County Organiser ; P. F. Kendall, B.Sc., Lecturer on Zoology, East of Scotland College.

Glasgow and West of Scotland College of Agriculture.

Dumfriesshire.	*Colleagues.*
The parish of Durisdeer near Thornhill—the Marr Burn area,—with the farms of Marr, Crairieknowe and Breconside. The area is fairly isolated, and the stocks on the whole homebred. Also Dormont.	John Gillies, N.D.A., N.D.D., County Organiser; Robert Bruce, B.Sc.; Mr Magnus Halcrow (month of April).

Kirkcudbright.	*Colleagues.*
The neighbourhood of Borgue, a peninsula with at least partial immunity from reinfestation. The farms of Balmangan, The Ross and Upper Senwick. For special experiments the farms of Nuncraig, Phenton, Rainton, Plunton, Kirkeock.	Hugh M. Young, N.D.A., N.D.D., County Organiser; Charles Turner, B.Sc., N.D.A.

Wigtown.	*Colleague.*
The farms of Baltersan, Upper Barr, East Mains, Low Barness.	Mr A. E. Stevenson, M.R.C.V.S. (April).

The North of Scotland College of Agriculture.

Kincardine.	*Colleagues.*
With the farms—Balmakewen, Marykirk; Burnton, Laurencekirk; Westerton of Pitarrow, Laurencekirk; Conveth Mains, Laurencekirk; East Cairnbeg, Auchinblae; Mains of Fordoun, Fordoun; Balfeith, Fordoun; Kair, Fordoun; and Craibstone, Aberdeenshire. The above area may be taken as representing a 'feeding' area.	George Donald, B.Sc., Assistant in Department of Agriculture, Marischal College. Mr Donald acknowledges the friendly assistance of Dr Robertson and Dr Morison of the University Zoology Department, and Miss Bain and Mr M'Gillivray of the County Staff.

Aberdeenshire.	*Colleague.*
The area was Alford, a good cattle-breeding district, though there is some buying in from Ireland and the south of Scotland. The farms of Braehead, Breda, Greystone, Gallowhill, Muir, Shannoch, Wellhouse, Turpursie, Cully Blean, Annfield, Craigmeadows, Dubstone.	Donald Mackay, B.Sc., Assistant County Organiser.

A census of the animals treated in 1930 and re-examined (omitting animals not described by name) yielded the following. :—

Kind of Animal.	Number of Animals Examined.	Number Free.	Number Warbled.	Warbles Treated.
Bulls . .	86	67	19	88
Cows . .	2548	2049	499	2448
Yearlings . .	..	..	408	2574
Yearling Heifers .	77	73	4	9
18 months or six-quarter animals	..	..	97	528
2-year-old bullocks	..	..	397	2880
2½ to 3 years old	..	..	12	95

The total of treated larvæ represents those actually reported on. The result of the treatment in many cases could not be stated exactly [1] because on the second or third visit the warble cells were empty, or treated cattle had been sold, or were out on the hills and could not be reached for further examination.

THE VARIOUS DRESSINGS IN DETAIL.

1. *Polvo Powder Soap Wash.*

The formula for this dressing is—

Derris Powder	1 lb.
Soft Soap	¼ lb.
Water	1 gallon

How to Prepare.—Dissolve the soft soap in a quart of boiling water, and allow to cool. It is important that the cooling be to blood heat at the least, for if the soap solution be used too hot when pouring on to the Polvo Powder (the Derris Powder), the active principle of the Derris may be adversely affected. Place the Polvo Powder in a bucket. Pour the cool soap solution over the Polvo Powder and stir thoroughly, bringing gradually up to a gallon by the addition of cold water. Use the dressing freshly made, and, while using, keep the fluid agitated so that the Polvo Powder may remain in suspension.

The worker feels with his hand for the lumps or swellings, not all of which are easily visible, and then pulling aside any matted hair, and clearing away the scab which so often clogs entry to the larva, applies the dressing. The methods have already been described on pages 53 and 54.

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[1] In returns, where larvæ had left the warbles after treatment, they were included among the "live larvæ" unless specially described.

It was not taken for granted that the dressing, if thoroughly applied, killed the larva. Four or five days, on an average, after the treatment a re-examination took place, and the treated larva was removed for examination to decide—alive or dead. Sometimes larvæ could not be pressed out on re-examination after treatment with the Polvo, as they had become quite decomposed, and broke easily when one tried to remove them. It was a common thing to find that larvæ killed by Polvo or other dressing and not removed by hand were extruded by the animal. Shrivelled skins of the spoiled larvæ projected from the holes in the warbles, and were easily picked off.

Two examples of methods of report are quoted. The first is from Mr Turner, who did the work at Borgue in Kirkcudbright.

The column on the left shows Mr Turner's way of recognising the animals he had dressed when he came to re-examine them. This was one of the great difficulties of workers, especially with animals not tied up, and even with tied-up animals, for they were often not tied twice in the same place. The Galloways were particularly difficult to distinguish one from the other when the treated animals had to be separated out at the time of re-examination. Other workers adopted a method of clipping, for recognition.

[TABLES

Farm—Upper Senwick. Dressed on 8th April. Examined on 16th April.
Class of stock—1-year-olds Polvo Soft Soap. 1st dressing.

Mark for recognition.	Larvæ.			Results.				Remarks.
	L.	R.	Total.	Removed.	Dead.	Living.	Empty holes.	
Off Plate, Red	8	7	15	14	14			1 remains in.
Near Plate, ,,	1	5	6	5	4	1		1 remains in.
Back, ,,	3	2	5	4	4		1	
Shoulder ,,	12	7	19	16	16		3	
Back of Head, ,,	8	7	15	15	15			
Forehead, ,,	9	8	17	17	17			
Off Plate, Blue	8	8	16	14	14			2 too small to remove.
Near Plate, ,,	7	14	21	21	21			
Back, ,,	9	15	24	20	16	4	2	
Shoulder, ,,	15	17	32	24	19	5	8	2 living ones immature.
Back of Head, ,,	4	4	8	7	6	1		1 missing.
Forehead, ,,	4	10	14	8	8			5 remain in or empty holes.
Unmarked	3	2	5	5	4	1		
Off Plate, Red		1	1	1	1			
Near Plate, ,,	2	5	7	7	7			
Back, ,,	7	2	9	9	9			
Back of Head, ,,	7	8	15	14	12	2		
	107	122	229	201	187	14		

Cattle dressed, 17. Number of Warbles: left side, 107; right, 122; total, 229. Average number per animal, 13·4. Three-quarter gallon of wash was used to dress the yearlings.

Number of Cattle.	Larvæ.			Removed.	Dead.	Percentage killed.
	L.	R.	Total.			
17	107	122	229	201	187	93

This second type of Report Sheet is one of the returns made by Mr Miller from the Ettrick Valley area.

CARTERHAUGH The Duke of Buccleuch. "Polvo" Dressing.

1st Visit.	No. of Cattle.	Description of Cattle.	Where grazed last Season.	Warbles dressed.	2nd Visit.	Total Warbles.	*H. lineatum.*		*H. bovis.*		Remarks.
							Dead.	Live.	Dead.	Live.	
30th April	10	Cows	On farm	Free							
	4	Yearling heifers	,,	,,							
	7	2-year-old heifers	,,	,,							
	10	Stirks	,,	,,							
5th May	10	Yearling bullocks	Irish	Free							
	A 1	,, ,,	,,	1	12th	1			1		
	B 1	,, ,,	,,	1	,,	1					1 undefinable.
	C 1	,, ,,	,,	3	,,	3	2		1		
	D 1	,, ,,	,,	1	,,	1					1 undefinable.
	E 1	,, ,,	,,	2	,,	2	1		1		
	3	2-year-old bullocks	,,	Free							
	A 1	,, ,,	,,	19	,,	15	10		5		2 into pus and 2 burst.
	B 1	,, ,,	,,	3	,,	3	1		1		1 undefinable.
	C 1	,, ,,	,,	4	,,	4			4		
	D 1	,, ,,	,,	6	,,	6	3		2		1 in 2nd last stage.
	E 1	,, ,,	,,	10	,,	10	2		8		
	F 1	,, ,,	,,	10	,,	10	6		3		1 undefinable.
	G 1	,, ,,	,,	16	,,	15	8		5		1 undefinable.
	H 1	,, ,,	,,	4	,,	4			2		2 undefinable.
	I 1	,, ,,	,,	19	,,	19	10		9		
	J 1	,, ,,	,,	1	,,	1					Burst inside.

GENERAL RESULT OF THE POLVO SOFT SOAP TREATMENT.

Taking together the dressings in the different areas in 1930 we get—

Larvæ treated with Polvo.	Larvæ killed.	Percentage killed.
3035	2785	91 per cent.

This percentage was often exceeded in individual cases, but in the mass experiment it can be looked on as highly satisfactory, considering that warbles had sometimes to be dressed in the open and without penning the animals.

The Polvo Soft Soap dressing proved an extremely satisfactory one. A careful worker, not under pressure, can reasonably expect at least a 95 per cent kill. One has to be careful, however, that the swellings are thoroughly wetted. A long coat may hide swellings as well as protect them from proper treatment, as was found, for example, on cross-Galloway cattle which at the time of dressing had a very thick covering of hair consisting of two coats—the inner short-haired coat and the coarse outer hair. The dressing loses some of its efficiency with keeping; it is better to use it freshly made.

The cattle treated with Polvo Soft Soap did not suffer in any way, nor did the workers experience any personal inconvenience in their work with Polvo. If by chance one has to work much with the Polvo Powder in a fine state of division, and in a dry form, then the powder should not be drawn up the nostrils. If a light-coloured animal had been dressed with Polvo Soft Soap a slightly dirty appearance marked the animal, but in a day or two this was no longer noticeable.

Cost of Treatment with Polvo.

As far as cost of material goes, the dressing is cheap. One cannot just give absolutely exact figures, because the amount of the dressing varies a little according to the method of treatment—syringe or cloth—and also according to the type of animal. One may say, taking an average, that the cost would, for material, be from less than a penny to just over a penny per animal.

Mr Donald, with his experience in the north, estimated that on a farm carrying 100 head of cattle the cost of dealing with the animals (with average warble presence) carefully, four times in a season (March to July), would at the highest be £5. To round up the cattle and dress them would take three men about a day. If the wages of the men worked out to about 7s. or so a day, the cost of the men would be £1. The amount of material used would depend on the amount of warble presence, but 5s. would cover the cost of the Polvo and soft soap at each dressing. Thus £1 per man for four dressings, plus £1 for material, works out to £5. Mr Donald points out that in the case of farms where few 'bought-in stores' were kept, the cost could very easily be less than £5 per 100 animals.

Cooper's Cattle Wash.

This Derris preparation—a combination of Derris with soap—requires only dilution to be ready for use. It forms when diluted with water a yellow-brown liquid, with rather a pleasant odour. It was used as a wash applied by a cloth, and was easy to apply. We had treatment of individual warbles as well, and by syringe, for comparison. When rubbed on the back a lather was formed. No harm resulted to the treated cattle when lathered; it gave the hide rather a fresh appearance. In special experiments where the temperature of the cattle was taken before treatment, half an hour after treatment, and again one hour after treatment, there was no alteration worth noticing. The farmers, and the workers too, liked the dressing, but the results were unequal and variable, and not to be compared in general excellence with the Polvo Soft Soap preparation. In all the experimental cases quoted the dilution was 1 of the Cooper's Warble Wash to 7 of water, the degree of dilution that had been advised.

A summary of the results worked out thus:—

Number of Warbles treated.	Larvæ killed.	Larvæ alive.
1067	809	258

A comparison of reports from the different areas indicates considerable variation, yet this part of the experiment came towards the end of the work when the workers had had considerable practice and experience.

Mr Bruce, in a comparison with warbles dressed individually as compared with the dressing used as a wash, reported:—

How used.	Number of Warbles.	Larvæ dead.	Larvæ alive.
Applied to each warble directly	105	88	17
Applied to whole of back .	74	63	11

Mr Donald's comparative results were:—

How used.	Number of Warbles.	Larvae dead.	Larvæ alive.
Individual warbles dressed .	106	60	46
As a wash all over the back .	156	94	62

The farmer is predisposed in favour of a dressing that can be used as a wash like this Cooper's Cattle Wash. The ease with which it can be made up, the simplicity and comparative speed with which it can be applied, all have their appeal. We hope research will yet provide a reliable wash.

The Ointment.

We used in the 1930 work Cooper's Warble Fly Ointment, which contains some of the active ingredients of Derris Ointments, &c.

Ointments have been in use for some time as a means of destroying the warble fly larvæ as they lie in the back with their breathing pores directed to the outside. Bishopp and his colleagues in the United States have used Iodoform Ointment, and a Derris Ointment, both with success. Walton[1] has experimented successfully with both, and in 1927 I recorded some success with the American formula 1 part of iodoform to 5 of vaseline. The Worcestershire Report of Mr Gaut and Dr Walton contains favourable notice of a Derris-containing ointment.

An ointment as compared with other dressings and modes of dressing has a somewhat limited use. If used later in the season, when long hairs have been shed and time allows for the thoroughness necessary for the success of the treatment, good results can be obtained.

We had intended to try out Cooper's Warble Fly Ointment, but the end of the season found us too busy for a test on a large scale.

Mr Turner on two farms in Kirkcudbright had a test on a small scale, with excellent results. The ointment was sent out in collapsible tubes with an elongated nozzle that allowed the ointment to be injected into the holes leading to the larvæ. To ensure efficiency the ointment is so pressed into the opening that a distinct plug is formed; this ends in the suffocation of the larva. The tests resulted as follows:—

Farm.	Number of Larvæ.	Date of Dressing.	Re-examined.	Larvæ dead.	Larvæ alive.
Phenton	16	June 11	June 16	14	2
Kirkeoch	21	June 12	June 18	19	2
	37			33	4

Questions are often asked concerning, and objection taken to, methods of destruction of parasites which may leave the killed parasite in, or, in the case of the warble larvæ, under the skin. Hadwen, who writes with such knowledge and professional skill, gives support to the view that it is not a good system which leaves under the skin dead larvæ of the size of Hypoderma larvæ. Hadwen [1] is inclined to think that ointment should only be recommended against the larva when it has just perforated the skin, the larva being then small, and without the tough outer covering characteristic of the final-stage larva. "In abattoirs," he says, "it is common to find the skins of warble grubs under the hides, which have remained there unabsorbed." One can reply, however, that absorption may take place. Further, dead skins can be thrown off by way of the hole leading to the cyst. Often after a dressing has killed the final-stage larva, the skin may be seen standing up out of the opening waiting to be thrown off. I was particularly interested in this when dealing with a number of milk cows under cover and accustomed to handling. I had broken, in experiment, a large number of warble larvæ as they lay in the back. I asked the cattleman in charge—an interested and knowledgeable man—not to groom the back of those animals as usual, but to wait until my observations were completed. The result was that for some days in succession a fair number of the skins of the squeezed and broken larvæ were seen projecting a little way out of the warble opening or standing up half-way out and more. We have also to remember that we must not forgo the chance to destroy the larva in its most vulnerable stage.

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[1] 'Further notes on Warble Flies in North Wales,' by C. L. Walton, Ph.D., M.Sc.

Xylol Preparations.

Two other dressings received a thorough test. In both preparations Xylol was the chief ingredient. Chance observations of the effect of Xylol on certain insects had suggested to certain observers that Xylol in some form as an insecticide might prove useful against warble fly larvæ, and as we knew that a good deal of thought and trouble had been taken to produce the preparations we took the opportunity to try them out. Of various modifications two were chosen that seemed to offer the best chances of success. We shall write of them as Solution A. and Solution B.

Solution A.

This sample contained Xylol in solution in a neutral Hydrocarbon Oil the density of which was such that an easy flow would be obtained.

Solution A. was a colourless viscous liquid with a distinct odour. It was easily applied by syringe to the warble hole, and to the eye readily entered. Although easy to work with, it gave poor results. The syringe was used, with individual treatment of the warbles, because it was desired to test with certainty the killing power.

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[1] "Insects affecting Live Stock." By S. Hadwen. Department of Agriculture, Dominion of Canada. Bulletin 29.

Here is a summary of the experiments with Solution A. :—

Warbles treated.	Larvæ killed.	Larvæ alive.
1198	469	729

Mr Bruce's and Mr Gillies's results from three farms, Breconside, Marr and Crairieknowe, were :—

Warbles treated.	Larvæ killed.	Larvæ alive.
658	217	441

A mixture of stock had been treated, and it was noticeable that the best results were with the dairy cows, which were kept indoors at the time of dressing, whereas the young stock were out for at least part of the day, exposed to wind and rain.

It is worthy of mention that with Solution A. there was no marked collapse of the larvæ and decomposition of larvæ such as marked the action of Polvo. The external form of the larvæ tended to be retained, with some dulling of colour.

Solution B.

This was a preparation of Xylol in solution with an alcohol of a propylic nature and acetone base, along with an essential oil. This dressing was less viscous than Solution A. and more volatile. It flowed easily from the syringe. It proved more effective than Solution A.

The general results with Solution B. were :—

Warbles treated.	Larvæ killed.	Larvæ alive.
1135	730	405

COMMENTS ON THE AREAS.

The Kincardine Area (Mr Donald).—In this region of experiment the habit is to buy in large numbers of cattle every year in 'store' condition for feeding purposes, though there are also some home-reared cattle. As regards the animals used in experiment in 1930 the Table shows how easily warble larvæ are spread.

Where grazed in 1929.	Number of Cattle.	Number warbled.	Number free.	Number of Warbles.
Shetland	10	0	10	0
Orkney	13	1	12	9
Home .	76	22	54	61
Ireland .	106	70	36	638

The presence of warble on Irish cattle is heavy. It is only fair to state that much interest is being taken in, and attention paid to, the warble question both in North Ireland and the Irish Free State. The Agriculture Departments and the Entomologists concerned are keenly alive to the problem.

Dumfriesshire.—Here the cattle stocks are home-bred. Warble is common. The work was concentrated on three farms :—

Marr with 94 cattle, 5 free and 89 with 746 warbles.
Crairieknowe with 82 cattle, 4 free and 78 with 603 warbles.
Breconside with 49 cattle, 1 free and 48 with 446 warbles.

The Ettrick and Yarrow Area.—This is a breeding area. It was an extensive area, difficult to cover as the holdings were so numerous though the average cattle content was not high. A not uncommon difficulty was met with here at the third dressing—namely, the difficulty or impossibility of reaching all cattle again. Even before the middle of May the younger cattle were out on the hills in the daytime at least, and soon were out permanently.

The Table of the first round examination for treatment shows that many animals were free.

Inspection.	Cattle.	Cattle free.	Cattle warbled.
First round . . .	1130	1005	125
Second round . . .	733	689	44
Third round . . .	584	582	2

The Kirkcudbright Area.—The part of the county chosen by Mr Young for the experiments was the peninsula of Borgue. Three farms were intensively worked by Mr Turner—viz., Balmangan, The Ross, Upper Senwick. A report on the 1st dressing at Upper Senwick was quoted, as an example, on page 59. The farm practice was largely dairying. Taking the animals of the three farms together we had at the 1st dressing:—

Class of Stock.	Number.	Number free.	Number warbled.	Number of Larvæ.
Cows . . .	192	130	62	348
2-year-old heifers + 6 bullocks .	47	7	40	362
1-year-old + 4 bullocks . .	55	1 (August calf)	54	607
Irish cattle . .	18	0	18	296
	312	138	174	1613

The 2nd dressing showed a great reduction in number of larvæ, and not many were found at the 3rd dressing. From May 31 to June 6 the young stock were reviewed and larvæ were removed as the animals were leaving for the hills.

The distribution of the two kinds of larvæ on the three farms was interesting. Balmangan lies between The Ross and Upper Senwick.

1st Examination—
  The Ross: 69 *lineatum* and 30 *bovis*; Balmangan: 62 *lineatum* and 6 *bovis*; Upper Senwick: no *lineatum* but 30 *bovis*.
2nd Examination—
  The Ross: 2 *lineatum* and 38 *bovis*; Balmangan: 7 *lineatum* and 9 *bovis*; Upper Senwick: no *lineatum* but 1 *bovis*.

The Aberfeldy Area.—This area—a breeding area—was an extensive one, and only an enthusiast like the County Organiser could have arranged for three dressings, the whole ground being covered three times. This would have been impossible but for the fact that so many animals were free from warble. One hundred and ten farms were visited and eighty found free from warble. Of more than 1000 animals examined only 123 were warbled, the larvæ numbering 434.

The Perth and District Area.—This is a feeding area. Ninety-four warbled animals were examined and 464 larvæ treated.

The Alford Area, Aberdeenshire.—Twelve farms were worked. The amount of warble infestation was small.

A summary is :—

Number of Cattle.	Free.	Warbled.	Number of Warbles.
332	229	103	488

THE WORK IN 1931.

The year 1931 was marked by a great extension of the warble work, an extension which would not have been possible but for the co-operation of the three Agricultural Colleges and the County Organisers. No fewer than twenty-four Scottish counties took part, either in intensive work, with four dressings or three dressings, spread over the warble season, or else in Demonstration work which had the value of testing the dressings and also of interesting others in the county, but outwith the particular area of the demonstration.

One was glad to report encouraging features :—

(1) Increased interest in the warble question.
(2) An increasing number of farmers who, convinced of the excellent results attending the Derris dressings, dressed their own cattle.
(3) The proved progressive reduction in warbles during

the warble season, consequent on the three or four repeated dressings.

(4) In some cases a reduction in warble infestation in areas where experimental dressing was done the previous year. Here, however, one must be careful, for there can be other factors besides the 1930 dressing factor.

(5) The cumulative evidence that in Polvo or other reliable Derris preparations the farmer has at hand a cheap (but not nasty) dressing, not difficult to apply, to be relied on as efficient in killing the warble larvæ, and without harm to the health or hide of the treated cattle.

KIND OF STOCK AND AMOUNT OF WARBLE INFESTATION.

Some idea of the work done in 1931 will be gained in looking over the subjoined Tables, in which I have made an analysis of the stock treated for warbles in twenty-two counties, plus the Western Isles area, and the number of warbles treated. The Tables also indicate the kind of animal suffering most or least from warble. From the standpoint of age as a factor in warble infestation, the age of the attacked animals has been added where we were able to obtain trustworthy information. The reader will also remember the work involved in the examination of great numbers of animals that led up to the separation of the warbled animals from animals free from warble.

Cows.

Age.	Number.	Number of Warbles.
2 years	39	249
2½ ,,	48	209
3 ,,	121	836
4 ,,	137	705
5 ,,	100	590
6 ,,	95	553
7 ,,	74	297
8 ,,	45	205
9 ,,	22	53
10 ,,	21	122
11 ,,	4	16
12 ,,	2	5
14 ,,	1	1
15 ,,	1	8
No age given	119	753
	829	4602

Heifers.

Age.	Number.	Number of Warbles.
Yearling	133	1259
1½ yrs. to 2½ yrs.	48	479
2 years	114	1266
3 years	28	219
No age given	12	32
	335	3255

Bullocks.

Age.	Number.	Number of Warbles.
1 year	133	1293
1½ years	189	1209
1½ yrs. to 3 yrs.	141	819
2 years	55	332
2½ years	29	194
	547	3847

*Stirks.**

Age.	Number.	Number of Warbles.
1 year	107	1034
2 years	1	5
No age given	6	81
	114	1120

* Bullocks and heifers kept for feeding purposes.

Bulls.

Number.	Number of Warbles.
39	265

Three different dressings were used and tested in 1931—viz., the Polvo and Soft Soap of 1930, Warble Fly Powder, and a Derris preparation in liquid form.

THE THREE DIFFERENT PREPARATIONS USED IN THE WARBLE CAMPAIGN.

1st.—*Polvo Powder and Soft Soap.*

The formula used in the 1931 experiments in Scotland was—

Polvo Powder	1 lb.
Soft Soap	¼ lb.
Water	1 gallon

This is the formula already quoted in the 1930 work. As with the 1930 experiments, so reference to Tables and figures that follow will show the marked success of the Polvo Soft Soap dressing. Where treated animals are not in excessive numbers, and where the conditions allow the dressing to be thorough, a 100 per cent kill may be attained if the entrance hole to the larva be large enough and the larva itself of fair size.

Some of the Polvo Soft Soap results in 1931 :—

County.	Warbles treated.	Larvæ alive on re-examination.	Larvæ dead on re-examination.
Mid-Lothian . . .	221	18	203
Fife	471	50	421
Kinross	162	2	160
Clackmannan . . .	191	5	186
Perthshire	508	48	460
Peeblesshire . . .	190	6	184
Dumfriesshire . . .	2433	197	2236
Selkirkshire . . .	191	3	188
Roxburghshire . . .	145	0	145

2nd.—*Warble Fly Powder.*[1]

In this preparation the Derris is already incorporated with the soap, and for use one has only to add water. The Warble Fly Powder was procured in 1 lb. packets, this quantity of Powder serving for a gallon of water. The instructions followed by the workers were: Place the contents of a 1 lb. packet in a pail or tub and gradually add soft warm water, stirring thoroughly until this mixes to a thin cream, then add the bulk of water up to 1 gallon. Stir and keep the solution agitated while it is being applied. Use the wash freshly made up.

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[1] This Derris preparation was obtained from Messrs Cooper, M'Dougall & Robertson.

Speaking generally, the Warble Fly Powder proved a most successful dressing. As regards percentage kill there was a tendency among the workers to slightly favour Polvo, but one of our most experienced workers wrote to me: "The Polvo has given very gratifying results. It is safe to say from what I have seen that the Warble Fly Powder is as effective as Polvo if one takes care to dress very thoroughly, and in such cases both can give a 100 per cent kill."

Whether one favoured Polvo or no, all were agreed that the Warble Fly Powder was somewhat easier to prepare and easier to handle than Polvo. It also went further than Polvo, which itself is a very economical dressing. The Warble Fly Powder lathers up quickly; the clean, soapy appearance and the fresh smell of the mixture appealed to farmers, especially dairymen.

Concerning his experience with the Warble Fly Powder dressing, Mr J. O. S. Miller reported: "Unless enough of it is applied, there is always a small percentage of live larvæ left after treatment. I have noticed that it was best to pour it on slowly and allow it to soak through the coat before any rubbing was done. When rubbed in immediately it tended to turn to froth, and was difficult to rub into the skin."

SOME WARBLE FLY POWDER RESULTS.

County.	Warbles treated.	Larvæ alive on re-examination.	Larvæ dead on re-examination.
Dumfriesshire . . .	286	17	269
Perthshire	388	42	346
Selkirkshire . . .	98	7	91
Roxburghshire . . .	555	46	509
Berwickshire . . .	494	7	487

THE EFFECT OF RAIN FOLLOWING THE TREATMENT.

In comparing the results of the dressings, it was found that, on some occasions, the percentage kill of dressed larvæ was far lower than usual. In considered cases, the only differing factor was found to be heavy rain, or rain soon after dressing. In an actual experimental test, Mr Arthur Hutcheson took a very smooth-haired animal and after treatment turned it out into heavy rain. On re-examination after some days the percentage kill of larvæ was only 43 per cent, whereas controls not turned out in rain after treatment gave a 94 per cent and higher kill of larvæ.

With Warble Fly Powder Mr Philip Teare had the following results :—

Farm.	Warbles dressed.	Alive on re-examination.	Dead on re-examination.	Nature of Weather.
Nuncraig .	69	20	49	A heavy shower 2 hours after dressing.
,, .	22	0	22	No rain.
Kirkeoch .	70	5	65	No rain.
Chapelton .	105	41	64	Heavy rain after dressing.
,, .	57	8	49	No rain.

3rd.—*The Liquid Dressing.*

Always our aim has been to work up to a dressing which, in ease of application and certainty of destruction of larvæ, would be an encouragement to the regular dressing of warbles. The Polvo Soft Soap dressing is easy enough to prepare, but still the farmer has to make, and add to the Polvo, a solution of soft soap and also water. The Warble Fly Powder, with the soap already incorporated and ready to use at once, on the addition of water, at least makes the original 'make-up' by the farmer a little easier and saves time.

Was it still possible to have improvement? This hope led to tests with a Derris preparation in Liquid form, and needing only a dilution with water to make it ready to apply. The method of application was also easy for the worker. A strong 10-oz. bottle with a wide mouth had a mark placed on it at the level of 1 oz. In preparing the dressing all the worker had to do was to pour in from his supply 1 oz. of the Liquid Derris preparation, and then fill up the bottle with water. The bottle was fitted with a rubber stopper (cork would have done); through the centre of the stopper ran a hole into which was fitted a small glass tube open at both ends; this glass tube dipped at one end into the liquid dressing, while the free end of the tube projected above the stopper for just over an inch.

In applying this Liquid dressing, the scab was removed from the opening into the swelling; the bottle was tilted and a little of the dressing run in; complete entry was assured by slight massage by means of a finger.

Mr Magnus Halcrow and Mr J. O. S. Miller tested this Liquid dressing, but its killing power was poor, as was proved on re-examination of the treated larvæ five days after treatment, thus :—

Number of Warbles.	Larvæ alive.	Larvæ dead.
337	214	123

An improved form of this Liquid dressing was tested by Mr Robert Bruce and by Mr J. R. Raeburn. It was near the end of the warble season, and warble material was scanty. The results were :—

Number of Warbles.	Larvæ alive.	Larvæ dead.
77	37	40

Experiment on a larger scale had been planned for Mr J. C. F. M'Intyre in Perthshire, but the outbreak of foot-and-mouth disease made the experiments impossible.

THE PARTICIPATING COUNTIES.

I review these in alphabetical order, except in certain cases where it is more convenient to take several counties together. It is impossible in this survey to repeat in detail the many and full Tables that were a feature of the separate Report [1] issued to Members of the Highland and Agricultural Society and to the members of the Leathersellers' Company's Committee. Four Tables are given as examples (pages 76, 77, 78 and 81), and an effort has been made, generally, to bring out salient points.

Aberdeenshire.—Mr Gordon Watt, Assistant County Organiser, carried out dressings on eight farms in the Alford area where 319 animals were examined and 64 found warbled. One Friesian bull had 49 warbles on a part of the back; the hair was much matted at the places where the warbles were most numerous. Because of the condition of this animal it received two dressings with Polvo, one on 20th April and another on 23rd April. The bull was examined on 30th April and 46 larvæ were removed, all dead; the remaining three were not recovered.

As a dressing Polvo Soft Soap proved most satisfactory.

Argyll.—Mr John Wilson, the County Organiser, arranged for, and took part in, demonstrations of the Polvo Soft Soap treatment, including two farms on the island of Kerrera. Some of the cattle treated for warbles were Highland Cattle, not easy to treat because of their shaggy and matted coats; the extra attention given to them had good results.

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[1] "The Warble Fly Problem." Report on Experiments conducted in Scotland in 1931. Issued by the Highland and Agricultural Society.

On some farms, not reachable by Mr Wilson because of pressure of work, the farmers themselves did the dressing and expressed thorough satisfaction with their experience.

Of other cattle, some bullocks grazed in the previous year on the Island of Mull were amongst the worst warbled.

At Appin Home Farm 11 cows had 188 warbles, 19 immature. Dressed with Polvo in April and examined for result on 10th April, 160 of the larvæ were dead.

Ayrshire.—Mr Robert Laird, County Organiser, secured a herd where the Polvo Soft Soap treatment could be demonstrated. Further, several farmers who could not be present at Mr Laird's demonstration were given the Polvo formula and dressed their own cattle. Mr Laird's demonstration was at Sorbie Farm. Sixty-one animals with 384 larvæ were dressed. All the animals were home stock grazed at Sorbie in the previous year.

Berwickshire.—Grouped with Roxburgh and Selkirk. (*See* page 83.)

Caithness.—Mr Alexander Macaulay, the County Organiser, very willing to help, reported that "warble fly is almost unknown in Caithness, or at any rate it was impossible to get cattle with warbles." Occasionally larvæ come in, on imported cattle, but in Caithness there is little importation. At a sale in Thurso on 28th April 1931 about 800 cattle were exposed. Mr Macaulay went through the byres before the sale, and only one cow was found with warbles.

Clackmannan.—This county is taken with Perthshire and Kinross. (*See* page 81.)

Dumbartonshire.—Mr A. Broadfoot, the County Organiser, had made out a list of likely farms, but by the time I was able to arrange for a colleague to carry out the dressings the young cattle were out at grass and not easily reachable. Mr Magnus Halcrow visited 14 farms and examined over 400 cattle, but the number of warbles at any one place was too small for demonstration work; 9 animals, however, were dressed at Smithston Farm, Croy. In the spring of 1932 the 1931 observations were followed up, and Mr Broadfoot had Polvo Soft Soap demonstrations in Dumbartonshire and a new area in West Perthshire. Twenty-one farms in East and West Dumbartonshire were visited, 31 cattle being treated for 225 warbles. Three West Perthshire farms were visited, and 32 cattle treated for 169 warbles. All the farms chosen were dairy farms.

Dumfriesshire.—Mr John Gillies, the County Organiser, and Mr Robert Bruce, who had been so helpful in 1930, were fortunately available, and Mr Bruce worked the farms of Marr and Crairieknowe intensively from the end of March till the end of June. At Marr Farm there were 59 dairy cows, 19 two-year-old heifers, 20 yearling heifers and 3 bulls. At Crairieknowe Farm there were 45 dairy cows, 18 two-year-old heifers, 9 three-year-old heifers, 12 yearling heifers and 2 bulls. In the course of the work 2000 warble larvæ were treated and reported on.

A Table from each farm illustrates part of the work :—

CRAIRIEKNOWE (DAIRY COWS).

Number of Animal for recognition.	Breed.	Age.	Where grazed last season.	1ST DRESSING (Polvo). Application, 1st April 1931. Examination, 7th April 1931.				2ND DRESSING (Warble Fly Powder). Application, 22nd April 1931. Examination, 28th April 1931.				3RD DRESSING (Polvo). Application, 15th May 1931. Examination, 21st May 1931.				4TH DRESSING (Polvo). Application, 15th June 1931. Examination, 22nd June 1931.			
				Number of larvæ dressed.	Number removed.			Number of larvæ dressed.	Number removed.			Number of larvæ dressed.	Number removed.			Number of larvæ dressed.	Number removed.		
					Alive.	Dead.	Total.		Alive.	Dead.	Total.		Alive.	Dead.	Total.		Alive.	Dead.	Total.
1	Ayrshire cow	8 years	Home	4	0	4	4	Free	..	..	..	2	0	2	2	1	0	1	1
2	,,	4 ,,	,,	9	7	2	9	2	1	1	2	Free	..	..	..	2	1	1	2
3	,,	4 ,,	,,	8	0	8	8	1	0	1	1	5	0	5	5	Free	..	..	..
4	,,	10 ,,	,,	Free	..	..	..	Free	..	..	..	Free	..	..	..	Free	..	..	..
5	,,	4 ,,	,,	21	1	20	21	9	1	8	9	12	1	11	12	Free	..	..	..
6	,,	6 ,,	,,	1	0	1	1	1	0	1	1	Free	..	..	..	Free	..	..	..
7	,,	4 ,,	,,	3	0	3	3	Free	..	..	..	Free	..	..	..	1	0	1	1
8	,,	4 ,,	,,	5	1	4	5	Free	..	..	..	Free	..	..	..	Free	..	..	..
9	,,	6 ,,	,,	4	0	4	4	Free	..	..	..	3	0	3	3	..	..	..	..
10	,,	5 ,,	,,	35	3	32	35	Free	..	..	..	7	0	7	7	1	0	1	1
11	,,	8 ,,	,,	Free	..	..	..	1	0	1	1	5	1	4	5	Free	..	..	..
12	,,	4 ,,	,,	16	0	16	16	Free	..	..	..	3	0	3	3	Free	..	..	..
13	,,	7 ,,	,,	3	1	2	3	1	0	1	1	3	0	3	3	3	0	3	3
14	,,	8 ,,	,,	15	1	14	15	3	0	3	3	1	0	1	1	Free	..	..	..
15	,,	7 ,,	,,	3	3	0	3	1	0	1	1	Free	..	..	..	Free	..	..	..
16	,,	5 ,,	,,	14	0	14	14	4	1	3	4	Animal dead.				..	..	..	..
17	,,	4 ,,	,,	13	1	12	13	Free	..	..	..	1	0	1	1	4	0	4	4
18	,,	4 ,,	,,	12	0	12	12	1	0	1	1	3	0	3	3	Free	..	..	..
19	,,	7 ,,	,,	11	1	10	11	4	0	4	4	4	1	3	4	1	1	0	1
20	,,	6 ,,	,,	11	0	11	11	1	0	1	1	Free	..	..	..	Free	..	..	..
21	,,	5 ,,	,,	4	0	4	4	Free	..	..	..	2	0	2	2	1	0	1	1
22	,,	5 ,,	,,	8	0	8	8	Free	..	..	..	Free	..	..	..	Free	..	..	..

CRAIRIEKNOWE (DAIRY COWS).—*Continued.*

Number of Animal for recognition.	Breed.	Age.	Where grazed last season.	1ST DRESSING (Polvo). Application, 1st April 1931. Examination, 7th April 1931.				2ND DRESSING (Warble Fly Powder). Application, 22nd April 1931. Examination, 28th April 1931.				3RD DRESSING (Polvo). Application, 15th May 1931. Examination, 21st May 1931.				4TH DRESSING (Polvo). Application, 15th June 1931. Examination, 22nd June 1931.			
				Number of larvæ dressed.	Number removed. Alive.	Dead.	Total.	Number of larvæ dressed.	Number removed. Alive.	Dead.	Total.	Number of larvæ dressed.	Number removed. Alive.	Dead.	Total.	Number of larvæ dressed.	Number removed. Alive.	Dead.	Total.
23	Ayrshire cow	6 years	Home	29	2	27	29	10	1	9	10	4	0	4	4	Free	..	..	..
24	,,	5 ,,	,,	17	1	16	17	6	0	6	6	4	1	3	4	Free	..	..	..
25	,,	4 ,,	,,	25	3	22	25	8	0	8	8	8	0	8	8	1	0	1	1
26	,,	4 ,,	,,	9	1	8	9	2	1	1	2	2	0	2	2	Free	..	..	..
27	,,	11 ,,	,,	Free	..	..	..	Free	..	..	..	Free	..	..	..	Free	..	..	..
28	,,	4 ,,	,,	11	1	10	11	3	0	3	3	2	0	2	2	2	0	2	2
29	,,	5 ,,	,,	2	0	2	2	Free	..	..	..	Free	..	..	..	Free	..	..	..
30	,,	6 ,,	,,	3	0	3	3	Free	..	..	..	Free	..	..	..	1	0	1	1
31	,,	5 ,,	,,	Free	..	..	..	Free	..	..	..	Free	..	..	..	Free	..	..	..
32	,,	8 ,,	,,	Free	..	..	..	Free	..	..	..	Free	..	..	..	Free	..	..	..
33	,,	5 ,,	,,	2	0	2	2	Free	..	..	..	1	0	1	1	1	0	1	1
34	,,	4 ,,	,,	Free	..	..	..	Animal dead.				..	..	..	..	..	..	..	..
35	,,	4 ,,	,,	6	0	6	6	2	0	2	2	Free	..	..	..	Free	..	..	..
36	,,	8 ,,	,,	13	1	12	13	1	0	1	1	Free	..	..	..	Free	..	..	..
37	,,	5 ,,	,,	12	0	12	12	Free	..	..	..	Free	..	..	..	Free	..	..	..
38	,,	8 ,,	,,	7	3	4	7	Free	..	..	..	Free	..	..	..	Free	..	..	..
39	,,	5 ,,	,,	31	1	30	31	4	0	4	4	2	0	2	2	3	0	3	3
40	,,	7 ,,	,,	6	0	6	6	Free	..	..	..	Free	..	..	..	Free	..	..	..
41	,,	7 ,,	,,	7	2	5	7	Free	..	..	..	Free	..	..	..	Free	..	..	..
42	,,	7 ,,	,,	5	0	5	5	4	0	4	4	3	0	3	3	1	0	1	1
				385	34	351	385	69	5	64	69	77	4	73	77	23	2	21	23

MARR FARM YOUNG STOCK.

Number of Animal for recognition	Kind of Animal	Age.	Where grazed last season.	1ST DRESSING (Polvo). Application, 31st March 1931. Examination, 6th April 1931.				2ND DRESSING (Warble Fly Powder). Application, 21st April 1931. Examination, 27th April 1931.				3RD DRESSING (Polvo) Application, 14th May 1931. Examination, 21st May 1931				4TH DRESSING (Polvo). Application, 16th June 1931. Examination, 22nd June 1931.			
				Number of larvæ dressed.	Number removed.			Number of larvæ dressed.	Number removed.			Number of larvæ dressed	Number removed			Number of larvæ dressed	Number removed.		
					Alive	Dead	Total.		Alive	Dead.	Total.		Alive.	Dead.	Total		Alive	Dead.	Total.
1	Ayrshire heifer	2 years	Away	20	1	19	20	8	0	8	8	3	0	3	3	Free	..	..	..
2	,,	,,	Home	Free	..	..	..	Free	..	..	..	Free	..	..	..	Free	..	..	..
3	,,	,,	,,	7	0	7	7	2	0	2	2	4	1	3	4	1	0	1	1
4	,,	,,	,,	4	1	3	4	2	0	2	2	2	0	2	2	Free	..	..	..
1	,,	,,	Away	19	1	18	19	4	0	4	4	3	0	3	3	Free	..	..	..
2	,,	,,	,,	6	0	6	6	2	0	2	2	4	0	4	4	Free	..	..	..
3	,,	,,	,,	50	2	48	50	15	2	13	15	8	1	7	8	Free	..	..	..
4	,,	,,	,,	27	1	26	27	3	0	3	3	2	0	2	2	Free	..	..	..
1	,,	,,	,,	30	2	28	30	8	0	8	8	3	0	3	3	Free	..	..	..
2	,,	,,	,,	14	1	13	14	7	0	7	7	10	1	9	10	Free	..	..	..
3	,,	,,	,,	9	1	8	9	Free	..	..	..	5	1	4	5	Free	..	..	..
4	,,	,,	,,	18	4	14	18	6	1	5	6	12	0	12	12	2	0	2	2
1	,,	,,	,,	15	0	15	15	Free	..	..	..	6	0	6	6	Free	..	..	..
2	,,	,,	Home	7	0	7	7	2	0	2	2	3	0	3	3	Free	..	..	..
3	,,	,,	Away	50	2	48	50	Free	..	..	..	6	0	6	6	Free	..	..	..
4	,,	,,	Home	11	2	9	11	2	0	2	2	3	1	2	3	Free	..	..	..
1	,,	,,	,,	3	0	3	3	6	1	5	6	4	0	4	4	Free	..	..	..
2	,,	,,	,,	10	0	10	10	Free	..	..	..	4	1	3	4	Free	..	..	..
3	,,	,,	Away	5	0	5	5	3	0	3	3	2	0	2	2	Free	..	..	..
1	Ayrshire bull	Aged	Home	Free	..	..	..	Free	..	..	..	Free	..	..	..	Free	..	..	..
2	,,	2 years	,,	4	0	4	4	Free	..	..	..	Free	..	..	..	Free	..	..	..
3	,,	1 year	,,	4	1	3	4	Free	..	..	..	Free	..	..	..	Free	..	..	..
				313	19	294	313	70	4	66	70	84	6	78	84	3	0	3	3
				94 per cent kill.				94 per cent kill.				93 per cent kill.							

TWENTY YEARLING HEIFERS.

Number of Animal for recognition	Kind of Animal	Age.	Where grazed last season.	1st Dressing: Number of larvæ dressed.	Alive	Dead	Total.	2nd Dressing: Number of larvæ dressed.	Alive	Dead.	Total.	3rd Dressing: Number of larvæ dressed	Alive.	Dead.	Total	4th Dressing: Number of larvæ dressed	Alive	Dead.	Total.
1-14	Ayrshire heifer	1 year	Home	All of these (Nos. 1 to 14) remained quite free from Warble throughout the experiment.															
15	,,	,,	,,	2	2	0	2	1	0	1	1	1	0	1	1	Free	..	..	..
16	,,	,,	,,	17	0	17	17	Free	..	..	..	2	0	2	2	Free	..	..	..
17	,,	,,	,,	5	0	5	5	Free	..	..	..	Free	..	..	..	Free	..	..	..
18	,,	,,	,,	3	1	2	3	2	0	2	2	Free	..	..	..	Free	..	..	..
19	,,	,,	,,	10	1	9	10	Free	..	..	..	Free	..	..	..	Free	..	..	..
20	,,	,,	,,	1	1	0	1	1	0	1	1	Free	..	..	..	Free	..	..	..
				38	5	33	38	4	0	4	4	3	0	3	3	..	..	..	..

At Dormont the cattle were examined by Mr A. E. Stevenson and Mr L. C. Comrie. Of 45 cattle, all home grazed in the previous summer, 21 were free from warble; the remaining 24 had 238 warbles. After the 2nd dressing (Polvo Soft Soap) 81 larvæ were found dead and 2 alive. Visited on 1st July by Mr Bruce, all the animals were clear of warble save one, which had 8 warbles.

Fife.—Mr James Macdonald and Mr Smith visited six farms for demonstration with Polvo Soft Soap. A summary gives—

Animals treated.	Number of Warbles.	Larvæ killed.	Larvæ alive.
39	471	403	38

This area was a 'feeding' area (see page 50), and as animals were being constantly sold off during the season comparison with dressings following the first were not made.

The reader will notice how the constant removal of warbled animals for slaughter results in the destruction of great numbers of larvæ, which cannot complete their development in the hide of a slaughtered beast.

Haddingtonshire or East Lothian.—This county is noticed amongst the Lothians. (*See* page 80.)

Kinross.—This county has been taken along with Perthshire and Clackmannan. (*See* page 80.)

Kirkcudbrightshire.—Mr Hugh M. Young, the County Organiser, had the assistance of Mr Philip L. Teare. Mr Teare worked over eight farms, using Polvo Soft Soap in some cases and in others Warble Fly Powder. An enthusiast to the end—the 1st dressings were in the last days of March and the last on 22nd June—Mr Teare examined 722 animals: 373 free from warble and the remaining 349 with 1606 warbles.

Lanarkshire.—Mr John Anderson secured three farms for demonstration with the Polvo Soft Soap dressing.

119 animals were examined, 99 of which were warbled with 1092 warbles. Noteworthy high numbers of larvæ were found—

At Kilnhill a 1-year-old heifer had 70 warbles.
„ „ „ „ 32 „
„ „ „ „ 33 „
„ „ „ „ 39 „
At Crookedstone „ „ 73 „
„ „ „ „ 39 „
„ „ „ „ 42 „
„ „ „ , 46 „

Mid-Lothian and East Lothian.—Mr J. R. Raeburn gave special attention to four farms in Mid-Lothian and eight farms in East Lothian. More than 180 warbled animals received attention and 1158 larvæ were dressed.

The number of cows free from warble is worthy of note: 73 free out of 96 at Fenton Barns, and in Mid-Lothian 61 free out of 68 at Colinton Mains.

There was further proof that dressing young larvæ that have recently reached the back is attended with great uncertainty in result; this is not because the larvæ are young, but because the hole leading to the chamber is small. It is better to leave the very young larvæ to a later dressing.

Moray and Nairn.—Mr W. G. Grant, the County Organiser, arranged for work at four farms; the dressing used was Polvo Soft Soap. 24 animals with 157 warbles underwent treatment in Moray, and 21 animals with 33 warbles were treated in Nairn.

Orkney.—Mr H. H. Corner, the County Organiser, wrote that warble infestation was practically non-existent in Orkney, save on imported cattle. In 1930 I reported that of 13 cattle brought in from Orkney to Kincardine, 12 were free from warble and 1 had 9 warbles.

Peebles.—Mr Thomas Dickson arranged for a demonstration with Polvo Soft Soap on two farms. Of 53 animals examined, 24 were free from warble, the remaining 29 had 112 warbles. On an eight months' old bullock no fewer than 70 larvæ were found at the time of examination. Naturally the bullock was not thriving. After treatment there was marked improvement, including much greater ease in handling.

Perthshire.—Mr J. C. M'Intyre, the County Organiser, in addition to mapping out the areas in this county, was kind enough also to arrange the experimental and demonstration ground in Kinross and Clackmannan. Mr M'Intyre had the assistance of Mr Magnus Halcrow till the end of April, and thereafter of Mr Arthur Hutcheson.

In the Aberfeldy area 61 farms and crofts were visited. The number of warbled cattle was 90 with 345 warbles. At the third inspection, from 10th June, 625 cattle were examined, only 7 were warbled and the number of warbles was 33.

Twenty-four farms on the north side of the Tay were also visited and the warbles treated.

Kinross.—The areas having been mapped out by Mr M'Intyre, the examination and treatment was carried on by Mr Arthur Hutcheson.

The first survey may be summarised :—

Number of Farms.	Number of Cattle.	Number Warbled.	Number of Warbles.
5	152	48	128

Treatment gave on re-examination 126 dead larvæ; 2 live larvæ.

The dressing had been Polvo Soft Soap. Other 2 animals with 8 warbles were kept as controls without being treated, and when examined later all 8 larvæ were alive and seemingly healthy.

Clackmannan.—This area, worked by Mr M'Intyre, could not be overtaken before 21st April. Six farms were visited.

A summary is :—

Cattle.	Free.	Warbled.	Warbles.
382	324	58	191

The treatment with Polvo was very successful.

Warbles treated.	Date of Treatment.	Date of Examination.	Larvæ alive.	Larvæ dead.	Doubtful.
32	April 21	April 28	1	31	..
108	April 23	April 28	1	104	3
51	April 24	April 30	1	49	1
191			3	184	4

The larvæ on a control bull were all alive. A second examination in late May yielded 27 larvæ on 15 animals. These were dressed on 26th and 27th May, and an examination on 3rd and 4th June gave 26 larvæ dead and 1 alive.

The third visit had to be abandoned on account of the foot-and-mouth disease restrictions.

Roxburghshire, Selkirkshire, Berwickshire.—It was possible, through the kindness of Mr Wannop, the County Organiser, assisted by Mr J. A. Lindsay, to group these three counties. The experimental work was carried out by Mr J. O. S. Miller.

Roxburgh.—A considerable part of the work took the form of demonstration combined with comparison between Polvo Soft Soap solution and Cooper's Warble Fly Powder. The Table shows the results :—

ROXBURGHSHIRE.

Farm.	First Dressing.									Second Inspection.						
	Kind of animal.	Animals free.	Warbled animals.	No. of Warbles.	Treated.	Nature of dressing.	Re-examined.	Larvæ alive.	Larvæ dead.	Date of Inspection.	Number of animals.	Warbled animals.	Number of Warbles.	Treated.	Larvæ alive on re-examination.	Larvæ dead.
Thornielaw . . .	2½ year bullocks	10	10	34	11/4/31	Polvo	15/4/31	0	34	16/5/31	20	0	..	..	..	..
Charterhouse . . .	2½ year bullocks	11	10	46	16/4/31	Warble Fly Powder	21/4/31	0	46	13/5/31	21	0	..	..	..	..
Greenend	1-year-old bullocks	1	15	270	19/4/31	Warble Fly Powder	24/4/31	37	233	13/5/31	16	12	49	13/5/31	2	47
Fens	2½ year bullocks	0	10	94	23/4/31	Warble Fly Powder	29/4/31	0	94	..	10	Inspected June 12 and all free from Warble.				
Bettyfield	2½ year bullocks	5	7	49	20/4/31	Warble Fly Powder	24/4/31	2	47	..	..	..	..	..	..	..
Roxburgh-Newtown . .	2 year bullocks	2	9	76	23/4/31	Warble Fly Powder	29/4/31	0	76	..	..	..	..	..	..	..
,, ,, . .	2 year heifers	0	6	82	29/4/31	Warble Fly Powder	6/5/31	4	78	..	..	..	..	.	..	..

Selkirkshire.—Seven farms were visited. On three of the farms the liquid dressing was tested (see page 72). On other three farms Polvo was the dressing, with this result:—

Animals warbled.	Warbles.	Larvæ killed.	Larvæ alive.
28	117	115	2

For the 2nd dressing 8 of the cattle provided 31 warble larvæ, all of which were killed by the dressing.

On the remaining farm Warble Fly Powder was the dressing:—

Warbles.	Dead on Examination.	Alive.
74	73	1

Berwickshire.—On three farms with 63 animals, of which 5 were free, Warble Fly Powder was the tested dressing, with the result:—

Animals warbled.	Warbles.	Dead on Re-examination.	Alive.
58	375	368	7

Sutherlandshire.—Mr A. J. Watt, the County Organiser, tested Polvo on 58 larvæ, present in 10 cattle. The 1st dressing killed 54 of the larvæ. Several crofters and gamekeepers to whom Mr Watt recommended the Polvo formula reported the treatment successful in result.

The Western Isles.—In the island of Harris Mr Charles Milne, the County Organiser, gave a demonstration with Polvo. The work was done by Mr Milne himself.

Cattle.	Warbles.	Dressed.	Examined.	Larvæ dead.	Larvæ alive.
25	95	6th May	13th May	90	5

Wigtownshire.—The work here was done by Mr A. E. Stevenson. Five farms were worked. On two of them 324 warbles were found on 53 animals. They were dressed with Polvo, with satisfactory result. On the other two farms 85 animals showed altogether 583 warbles. These were dressed with Warble Fly Powder, with satisfactory result.

THE 1932 REPORTS.

Dumbartonshire and West Perthshire.—The 1932 results for these areas have already been included in the statement for 1931.

Dumfriesshire, Dormont.—The cattle at Dormont were examined on 21st March, with this result:—

	Number.	Free.	Warbled	Number of Warbles.
Dairy Cows . . .	10	5	5	16
Store Stirks . . .	10	5	5	13
Out-Wintered Galloway Cattle . . .	22	19	3	11

Dates recorded by Colonel Carruthers for 1930, 1931 and 1932 prove that Dumfriesshire can be a very early area for ripe warbles.

Mr W. J. Grant and Mr D. Mackay, the County Organisers, North of Scotland College of Agriculture, in their demonstration and experimental work in Inverness-shire and Skye, found Polvo Soft Soap a satisfactory dressing.

EXPERIMENTAL WORK IN 1933.

Tests with alcoholic extract of pyrethrum. Through the kindness of Mr J. C. F. Fryer, Entomologist to the Ministry of Agriculture and Fisheries, a gallon of 20 per cent alcoholic extract of pyrethrum was sent to the Secretary of the Highland and Agricultural Society.

Pyrethrum had somewhat tended to go out of use as an insecticide until experiments conducted at the Ministry's Experimental Station some years ago proved that pyrethrum could not be neglected. We were anxious to give it a trial in relation to warble larvæ. - Mr Arthur Gofton, the chief Veterinary Officer for Edinburgh, arranged with the overseers at the Edinburgh Corporation Farms—viz., Colinton Mains and Bangour, that we might try the Pyrethrum extract.

The cattle belonging to the City of Edinburgh are so well looked after that, unfortunately for our warble experiment, when examined, few warbles were found.

Mr William Bruce of Seton Mains, East Lothian, courteously allowed an examination for experiment of his cattle, and here, too, warbles were scarce.

In our scheme four strengths of dressing were to have been tried, two with the addition of soap and two without, but partly because of the poverty of warble material and partly because the first tests gave a poor kill, we kept to the dressing with the greater pyrethrum solution content—namely, equal volumes of the alcoholic extract of pyrethrum and water. The results of the tests were unfavourable, though, before a final judgment, a pyrethrum extract should be tried out on a much larger scale.

We were greatly indebted to Mr Walter Scott, M.R.C.V.S., Assistant Veterinary Officer, for undertaking the work and reporting on it. Mr Walter Scott had, as associate, Mr Leslie C. Comrie.

Experiment 1—Colinton Mains Farm, Mid-Lothian.—117 cows and heifers and 4 bulls were examined and only 4 animals found warbled. A summary is :—

				Larvæ.		
Warbled Animals.	Warbles.	Dressed.	Examined.	Alive.	Dead.	Escaped.
4	14	22.4.33	28.4.33	3	3	8

The dressing was applied by means of a squeezed cloth.

Experiment 2—Bangour Farm, West Lothian.—46 cows and 2 heifers were examined and 11 found warbled. Taking the eleven together :—

				Larvæ.		
Warbled Animals.	Warbles.	Dressed.	Examined.	Alive.	Dead.	Escaped.
11	67	22.4.33	28.4.33	32	22	13

The dressing was applied by a syringe, whose nozzle was just introduced into the hole leading to the larva.

Experiment 3—Gracemount Farm, Liberton, Mid-Lothian.—42 cows and heifers were examined. Only 1 animal was warbled with 6 warbles. The dressing was introduced by a syringe.

			Larvæ.		
Warbles.	Dressed.	Examined.	Alive.	Dead.	Escaped.
6	8.5.33	12.5.33	0	4	2

Experiment 4—Seton Mains, East Lothian.—41 animals were examined. A summary gives :—

					Larvæ.		
Animals.	Warbled.	Warbles.	Dressed.	Examined.	Alive.	Dead.	Escaped.
41	15	38	5.5.33	9.5.33	14	18	6

A complete summary gives us :—

Farm.	Date of 1st visit.	Cattle examined.	Number of Warbles dressed.	Date of 2nd visit.	Number of Warbles found dead.	Number of Warbles alive.	Number of Warbles escaped.
No. 1.	22.4.33	121	14	28.4.33	3	3	8
No. 2.	22.4.33	48	67	28.4.33	22	32	13
No. 3.	8.5.33	42	6	12.5.33	4	0	2
No. 4.	5.5.33	41	38	9.5.33	18	14	6
No. 5.	25.4.33	11	0				
	Total .	263	125	..	47	49	29

Mr Comrie dressed 56 warbles in Dumfriesshire and reported a 50 per cent kill. The high number of larvæ that had escaped between the dressing and the re-examination complicated the results.

Cubé Root (Lonchocarpus).

The most important—*i.e.*, most efficient—of the insecticidal principles in Derris is *Rotenone.*

There is a South American genus of plants the extract of the roots of which on the average contains a higher percentage of Rotenone than Derris Roots. I was anxious to test this Cubé Root, and made a number of efforts to secure some. This was difficult, as the Peruvian authorities had prohibited, for the moment, the sending of the plant abroad. I was fortunate enough, through the courtesy of 'British Drug Houses,' to get 2 lb. of the material from a cargo that chanced to be on the high seas. The material arrived unfortunately so late in the warble season that it was only after careful search by Mr Gillies, County Organiser for Dumfries, and his assistant, Mr Bruce, that warbled cattle could be found. In the circumstances the experiment could only be on a very limited scale.

Using the proportions ¼ lb. of the powder to 1 gallon water, 43 warbles were dressed, and on examination for results 25 larvæ were dead, 5 larvæ were alive and 13 larvæ 'burst' in being squeezed out.

Using ½ lb. of the powder to 1 gallon of water, 42 larvæ were dressed, and on re-examination 30 larvæ were dead, 1 larva was alive and 11 larvæ 'burst' in being squeezed out for examination.

The dressing in these two experiments was done by means of a wrung cloth. A syringe had been tried first, but the powder clogged the nozzle.

ADDITIONAL COUNTY REPORTS.

Stirlingshire.—Miss E. Aitkenhead, the County Organiser, very willingly undertook propaganda work in relation to treatment for warbles. As a demonstration, 47 were dressed with Polvo.

Banff.—Mr Kemp, the County Organiser, examined 239 cattle on four farms. Reporting in May, very few cattle had been found infested.

Ross.—Mr Longmore, the County Organiser, reported making inquiries at the various auction marts. No complaints were received about warbles.

Shetland.—Mr Gordon Watt, the County Organiser, wrote: "During the month of May I attended cattle sales at Ollaberry, Voe and Walls, and inspected over 350 cattle, but found no trace of the larva of the warble fly on any of the animals examined. I have also visited a number of the larger farms and crofts, and examined stock, with negative results. From inquiry it would appear that warbled hides are occasionally found on cattle that have been reared on the islands, and that a decade ago it was very common, but recently few cases have been noted. It might be said therefore that the warble fly, though not unknown, is comparatively rare in Shetland."

QUESTIONS REGARDING OTHER DRESSINGS FOR TREATMENT AGAINST WARBLE LARVÆ.

Bovidera Oil.

In the course of our work I was asked to test a sample of Bovidera oil or Hypoderma oil, a dressing greatly favoured in Denmark for the destruction of warble fly larvæ as they lie on the back. I already had had Bovidera oil tested as a killing agent in experiments in 1927. While this Hypoderma oil did not do all the advertisements claimed for it, it can be recommended apart from its price. It is effective as a killing agent, especially against the younger larvæ. Mr—now Dr—D. Stewart Maclagan, who reported on the experiments with the Bovidera oil for me, gave his experience as follows: "The dressing has a strong odour resembling that of certain antiseptics, but cannot be called objectionable. Where less than four larvæ were dressed, the animal exhibited no signs of the effect of the oil. Where five or more larvæ required dressing the animal exhibited that it was at least feeling the presence of the oil. Sometimes the head was tossed up and down, and attempts were made to lick the dressing. Sometimes the animal stamped and occasionally lay down, but the irritation was only temporary, and passed off in five or seven minutes."

Besides Derris, and an oil, Bovidera or Hypoderma oil contains paradichlorbenzene.

HYDROGEN PEROXIDE, H_2O_2.

A question was addressed to me concerning Hydrogen Peroxide for the treatment of warble fly larvæ. Some years ago Mr John Armour of Niddry Mains told me of his sometimes having used Hydrogen Peroxide for this purpose, and with some success. I tested H_2O_2 at ten volumes strength, but found it very uneven in result. The liquid was poured into the warble cavity. On occasion the larva in the cavity so treated would, in a minute or two minutes, stand up out of the hole in the skin and then 'pop' out with some force. In other cases, given a fair chance, there was no response.

The larvæ experimented with were those of *Hypoderma bovis* in the last stage; some of these larvæ were at the beginning of their last stage, others were nearly mature.

Hydrogen Peroxide is a colourless, odourless, non-poisonous liquid with a slightly acid taste. The ten volumes strength, the strength at which H_2O_2 is generally sold and the strength used in my tests, contains about 3 per cent of H_2O_2.

H_2O_2 acts by liberating free oxygen. It has some use as an antiseptic, but as such its value is not very great. Used as a dentifrice it causes the saliva to froth up. Such frothing may be seen when H_2O_2 comes in contact with pus. It loses potency the longer it is kept. At present the ten volumes strength costs 9d. per lb.

Iodine.

Questions have also been put to me regarding Iodine in relation to warble fly.

In 1920-21 Dr L. V. Howard[1] referred to a very effective ointment, consisting of a mixture of iodine and vaseline, which, pressed into the warble holes of *Hypoderma lineatum*, resulted in a 100 per cent destruction of the larva.

Earlier than this, in spring 1914, great interest was shown in France in the work of Monsieur Adrien Lucet, who reported destruction of warble fly larvæ following injection of small quantities of iodine into the warble cysts.

In 1922 a small test was made at the Cambridge University Farm. The animal used in the experiment was a warbled baby-beef one. Eight to ten drops of a 2½ per cent tincture of iodine were injected at the end of April into each of a number of larvæ. The smaller larvæ collapsed as a result of the treatment, and were found with difficulty three days after the treatment. The 'beefling' was slaughtered on 31st May. All the larvæ were found under the hide, after flaying. The dead larvæ had not decayed, but were slightly shrunken, and the hide had healed over them. There was a complete absence of 'licked' beef or butcher's jelly in the neighbourhood of the warbles.

Associated with the injection of iodine into warble cysts is the question of the possibility of the absorption of iodine into the system, and the attitude of the Veterinary Inspector should a carcase of a slaughtered animal, recently injected, come before him. We know that iodine is absorbed when applied externally or internally, as it can be detected in blood, secretions and excretions, as iodine. But iodine is rapidly excreted, and in from a day to two or three days all traces of iodine will have disappeared from the site of its injection.

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[1] Report of the Entomologist, 1920-21: United States Department of Agriculture.

THE NUMBER OF DRESSINGS.

In any campaign against warble fly larvæ the number of times cattle must be dressed is of great importance. Specially important are the dates for the first dressing and the last. The Departmental Committee recommended four dressings against the larvæ in the back. The experience of Mr Gaut in Worcestershire and of the Leathersellers' Company's Committee supports the view of four dressings. To make sure of the destruction of the very earliest ripe larvæ and the latest there might be five dressings, but with the desire to encourage general treatment one may not urge five dressings, an additional dressing meaning so much extra time and labour, and undesirable movement and collecting of stock. We will therefore try to make the date of the first dressing not so early as to make the date of the last dressing likely to leave still time for the development of larvæ. Unfortunately we have two flies—*H. lineatum* earlier and *H. bovis* a month or so later. If we had only *bovis* to deal with—and this is one reason why in our work we have tried to get the species of larva named—we would not need to start work so early in March.

Taking examples from our experience of 1930, 1931, 1932, 1933, one has found warble larvæ appearing in considerable numbers in the hides in the Edinburgh abattoir in February. In the south of Scotland early warbles are noticeable in February. Dumfriesshire is an early County. Mr Hewetson of Baltersan, Wigtown, gave me March 3 as a date by which he was finding badly warbled cattle. In 1931 in South Roxburghshire falling away of mature warble larvæ was noticed in the second week of March. By 20th March considerable numbers of larvæ had left the back. As far north as Sutherlandshire warbles were ripe in the third week of March. In Kirkcudbright many larvæ had fallen to the ground by the last week of March.

The third week of March then is the critical time, and the 1st dressing should be undertaken early in that week. Three other dressings should take place at intervals of about a week.

DIFFICULTIES.

There is the difficulty of proving to the farmer that the presence of a small number of warble larvæ injures the health, and consequently affects the beef and milk production. The animal with a few warbles gives no evident sign of discomfort. But the small number to-day may be the plague of to-morrow.

The treatment has to be undertaken at the busy season of the year. From mid-March to the end of May all arable farmers are busy with sowing and planting, and extra long hours are being worked. Some would find it difficult to give warble dressing precedence. Admittedly the dressing work would be onerous at the beginning, but if the treatment were general it would become light and easy in time. But to insure this, treatment must be general.

There is here and there disheartenment at having to keep treating animals that became warble-infected elsewhere.

The dressing of 'store' cattle is sometimes not in favour, as this involves disturbing the fattening animals when it is desirable that there should be as little excitement as possible.

There would be little or no difficulty with dairy cattle, and there is little or none with special herds ; but there will always be this difficulty in many parts of Scotland as regards the thoroughness of a 3rd and a 4th collecting, examination and dressing. Cattle that are put out on to the hills in May are difficult to collect, and in some parts are left out till October.

THE POSITION OF THE BUTCHER AND THE TANNER.

The Butcher, the Tanner and the Leatherseller have a proved case. There is agreement that they suffer.

The solution of the problem lies with the Farmer.

THE EXCELLENCE OF POLVO.

The work of the past few years has put beyond all possible doubt the value of Polvo or such-like Derris preparation as a sure means of destruction of warble larvæ, easy to apply, harmless to the treated cattle, and economical.

THE DRY DISINFECTION OF OAT SEED.

By **D. G. O'BRIEN**, Ph.D., and **R. W. G. DENNIS**, Ph.D.

THE practice of seed disinfection has attained sudden and widespread popularity in Scotland in recent years, largely as a result of intensive propaganda on behalf of products applied in the form of a powder. It seems worth while, therefore, to give some account of the history of this movement and the reasons for its rapid development in this country.

Seed disinfection is no new discovery. As long ago as the beginning of the eighteenth century, farmers in the West of England were steeping their wheat seed in brine, in the belief that less bunt developed on the resultant crop. In 1807, Prévost,[1] in France, when experimenting with the effect of boiled water on fungal spores, found water boiled in a copper vessel inhibited germination. He therefore studied the toxicity of copper compounds to fungi and found that a 1 in 400,000 solution of Copper Sulphate (Blue Vitriol) prevented the germination of rust spores. Mathieu de Dombale developed Prévost's discoveries, and devised a practical application of them for the disinfection of grain against smut. He employed a solution of 1 lb. Copper Sulphate in 20 gallons of water, steeped his seed for twelve hours, dried and sowed immediately.

Treatment with blue vitriol alone was open to objection, owing to the danger of injury to the grain. Kühn, in Germany, 1866-73,[2] introduced a modification of the process by washing the grain in a 6 per cent milk of lime after steeping in vitriol. This, by removing excess copper sulphate, enabled the employment of stronger solutions for shorter periods—*e.g.*, ·5-1 per cent for about one hour. His method was widely adopted on the Continent, and is still commonly employed for wheat in England. In 1894-97 Formalin (40 per cent Formaldehyde) was successfully employed against Oat Smut in America.[3] About the first decade of the present century its use at the rate of 1 pint to 20-30 gallons of water was recommended and became popular in England.

Mercury is well known to be a deadly poison, and naturally, salts of this metal attracted considerable attention. To the earlier workers the best and most readily available was Mercuric Chloride (corrosive sublimate). This was found toxic to fungi in extremely weak concentrations, but its excessively poisonous nature rendered it dangerous to use and apt to injure the grain. With the rapid developments in organic chemistry, and their industrial application during and after the war, a number of more complex compounds of mercury became available. Certain of these, which proved more effective and safer than either Copper Sulphate, Formalin or Corrosive Sublimate, were placed on the market by German firms under various trade names. Perhaps the best known of these were Uspulun (30 per cent Mercury Chlorophenolate) and Germisan (Sodium cyano-mercury-cresolate).

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[1] Prévost, B., 1807: "Mem. sur la cause immediate de la carie, &c.," Paris, 1807. Quoted in E. Bourcart, 'Insecticides, Fungicides and Weed-killers.' (English Translation, London, 1913.)

[2] Kühn, 1873: Quoted in E. Bourcart, 'Insecticides, Fungicides and Weed-killers.' (English Translation, London, 1913.)

[3] Bolley, H. L., 1897: "New Studies upon the Smut of wheat, oats and barley." North Dakota Agric. Expt. Sta. Bul., 27.

All wet treatments, however, are open to the objection that they consume an excessive amount of time and labour, and that great care is needed to prevent injury to the seed. It was natural, therefore, that attention should be directed to the possibility of obtaining control of seed-borne diseases by the application of the toxic principle in the form of dry powder coating the grain. The earlier experiments on these lines, conducted while Copper compounds still held sway, were made with $CuSO_4$ and $CuCO_3$ dusts. Thus in 1902 Von Tubeuf[1] treated heavily bunted wheat with Copper Carbonate dust and secured excellent control—far better than with Bordeaux powder. In 1915 experiments with Copper Carbonate dust were carried out in New South Wales[2] with excellent results, and as a result this substance was tested extensively in America and more recently in England.

As organic mercurial compounds became available these naturally were also tested in the dry state. Gram,[3] 1925 in Denmark, and Müller and Molz,[4] 1925 in Germany, appear to have been the pioneers. The former tested finely ground Semesan and found it effective against leaf-stripe of barley. The latter similarly tried a number of un-named dusts embodying mercury, with striking results on wheat. These data were confirmed and extended by subsequent workers, so that proprietary dusts embodying organic compounds of mercury have come largely to replace liquids in the control of seed-borne disease, both on the Continent and in U.S.A.

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[1] Tubeuf, F. Von, 1902: "Studien ueber die Brand Krankheiten des Getreides und ihre Bekampfung. Arbeiten aus der Biologischen abcheilung fur Land-und Forstwirtschaft am Kaiserl Gesundheitsamte," II., part 4.

[2] Darnell-Smith, G. P.: "The use of Copper Carbonate as a Fungicide." 'Agric. Gazette,' N.S.W., 26, 242.

[3] Gram, E., 1925: "Afsvampnings-undersogelser. I. Forsog og prover med byg," 1917-24. Stat. Forsog. I. Plantekultur Beret, 182. (English Summary, pp. 75-76.)

[4] Müller, H. C., and Molz, E., 1914: "Versuche zur bekampfung der durch Pleospora trichostoma hervorgervfenen streifenkrankheit der Gerste." 'Deutsche Land. Presse,' 41, 205-206.

It is evident, then, that though a new fashion in Scotland, seed treatment has been in more enlightened countries a matter of common routine for generations. Most of the work, however, was done with wheat, barley or rye, and the necessity for the disinfection of oats does not seem to have been stressed, except where smut was a menace to the crop. In more genial climates leaf-stripe disease of oats attracts little attention, and it was left for O'Brien and Prentice, 1930,[1] to show that this was by far the most serious disease of oats in Scotland, and the cause of most of those failures in brairding formerly ascribed to destruction of the seedlings by leather jackets, wire-worm or eelworm.

The leaf-stripe fungus (*Helminthosporium avenæ*) attacks oats at two stages in their life-history, namely, the seedling and the maturing plant. Persistence of the fungus during the winter, when no host is open to its attack, is ensured by the formation of thick-walled resting bodies on the husk of grain harvested from an infected crop, and it is from this source that seedling, or primary, infection arises. Since every field of oats grown in this country may be expected to be more or less attacked by *H. avenæ* in late summer, it is evident that all stocks of oat seed will be more or less highly infected and liable to reproduce leaf-stripe on the seedlings. The necessity for treatment of the seed every year as a matter of routine is therefore manifest.

After the crop has brairded, symptoms of this disease appear as brown stripes of dead and mummified tissue extending from the base towards the tip of the first seedling leaf (Fig. 33). Sometimes the first leaf is killed completely before the second emerges, and the seedling dies. More frequently the lesion remains as an isolated stripe, and in seedlings of this class the second and third leaves usually exhibit symptoms similar to those on the first. Occasionally a brown spot or blotch develops on the fourth leaf also, but after this all trace of the disease, as such, vanishes for the time.

In the case of heavy infection, however, many of the seedlings involved fail to reach the ground surface, the young shoot being completely parasitised before it emerges from the tip of the coleoptile or shoot-sheath. Such plants are so weakened as to be unable to penetrate the overlying soil, assume a contorted, attenuated form and quickly perish (Fig. 34). The result is that poor braird which is so characteristic of oat fields sown with infected seed.

Late in July or early in August, under Scottish conditions, symptoms of leaf-stripe disease reappear in the field on the upper leaves of oat plants. They here take the form of minute brown flecks which gradually elongate and develop into more

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[1] O'Brien, D. G., and Prentice, E. G., 1930: "Leaf Stripe or Yellow Leaf of Oats." 'Scottish Journal of Agriculture,' 13, 272-283.

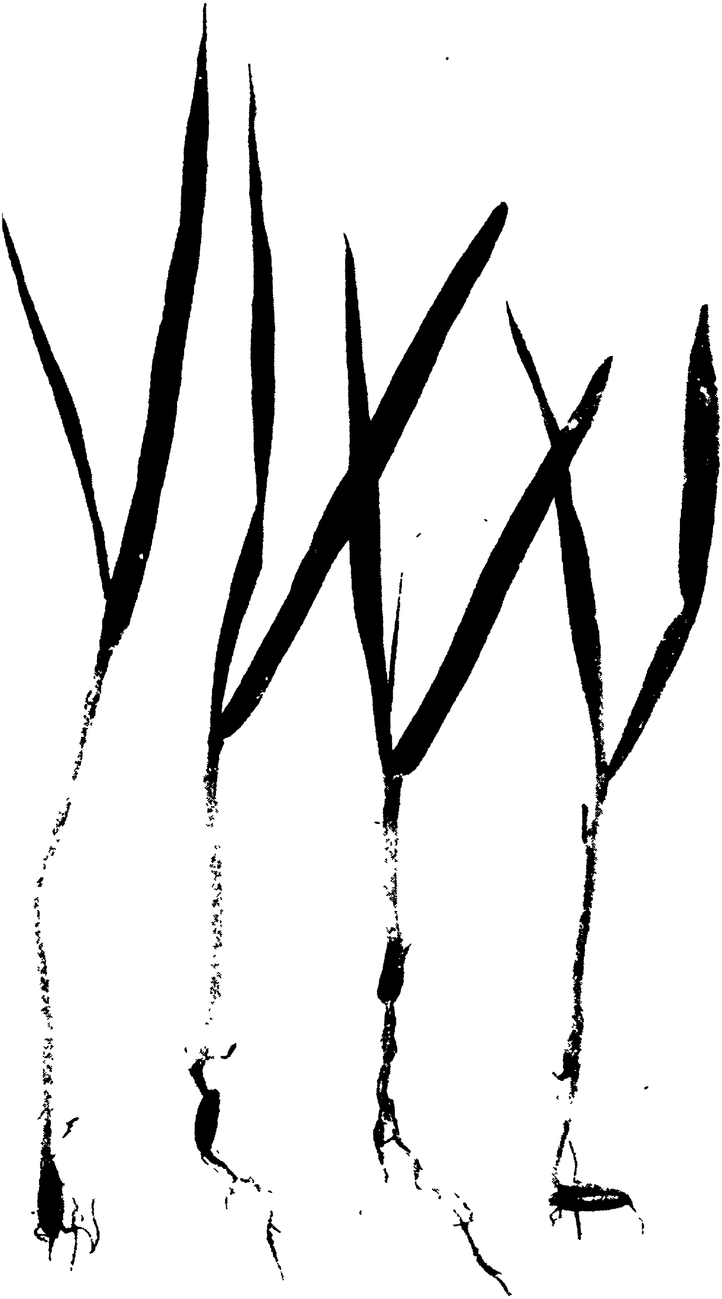

Fig. 33 —*Leaf-stripe Disease: the Primary Phase.*

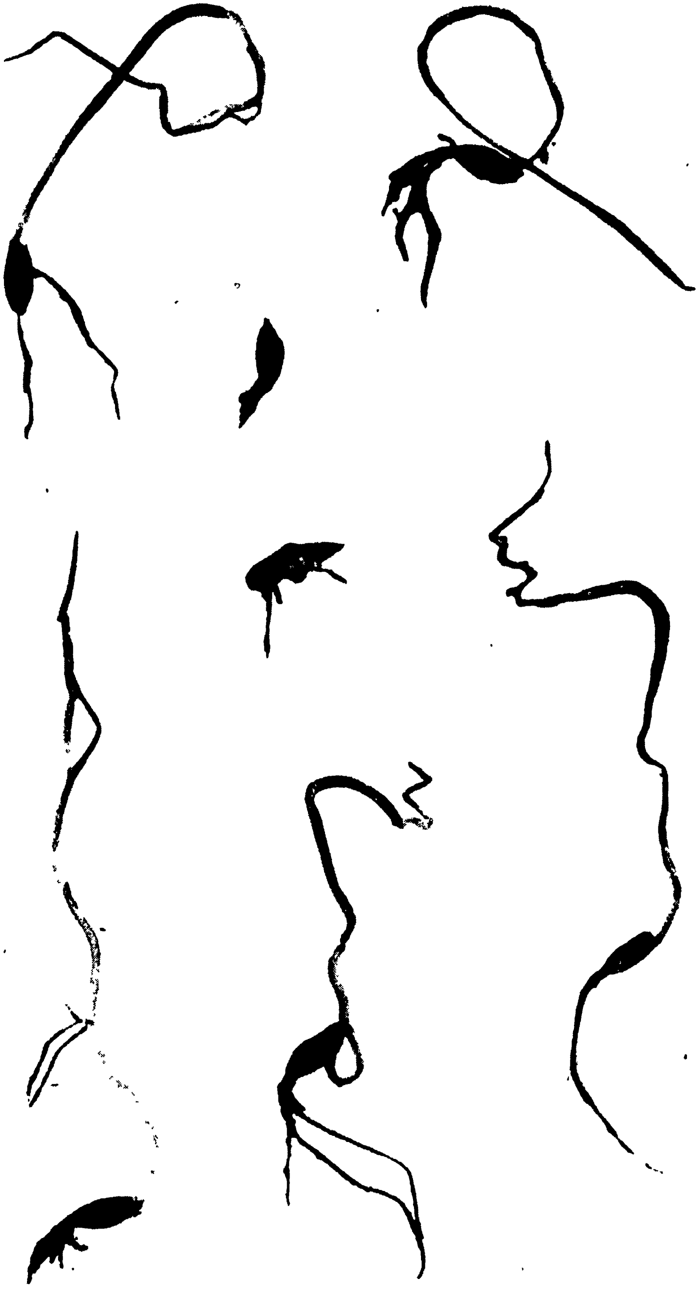

Fig. 34.—*Contorted Oat Seedlings: the pre-emergence phase of Leaf-stripe Disease.*

or less well-defined longitudinal stripes of dead tissue. This is the most conspicuous phase of the disease, but by no means the most destructive (Fig. 35).

The detrimental influence of the parasite on the host is shown in two ways :—

(1) In the killing of seedlings prior to brairding (pre-emergence blight).
(2) In the stunting which results from the loss or greatly reduced efficiency of the first three leaves.

In 1932 a number of selected seedlings, both infected and healthy, growing in the field, were kept under observation from time of brairding to that of harvest. Their condition at the time the healthy portion of the crop 'shot' is indicated in Table 1.

TABLE 1. DEVELOPMENT OF DISEASED AND HEALTHY PLANTS IN THE FIELD.

	Average Height.	Shortest Stem.	Tallest Stem.	Number of living Tillers per Plant.
Diseased Set .	24·5 in.	19·75 in.	30·0 in.	0·25
Healthy Set .	31·0 in.	22·5 in.	35·0 in.	1·3

It will be observed that the diseased plants were markedly shorter than the healthy ones and moreover had failed to tiller properly, there being only one living tiller between four plants (Fig. 36). These stunted oats are unable to fill the full number of spikelets, those at the base of the ear remaining barren and blasted. Under severe conditions the ear of an infected plant may be reduced to a couple of full spikelets only. This condition is distinguishable from that due to frit fly by the absence of contortion of the main axis below the ear. Blasting of spikelets is not due to direct infection by *H. avenæ*, but is merely a symptom of the general unhealthiness which results from the destruction of the early leaves and the overshadowing of infected plants by their healthy competitors.

The results obtained by disinfection of seed oats are more striking in some seasons than in others. This is due to the influence of climatic factors, more especially those at the time the seed was harvested and those during brairding.

Experiments carried out with *H. avenæ*, growing in pure culture on artificial media, show that it is especially susceptible to high temperatures. Under controlled conditions it is capable of growth at temperatures between about 5° C. and

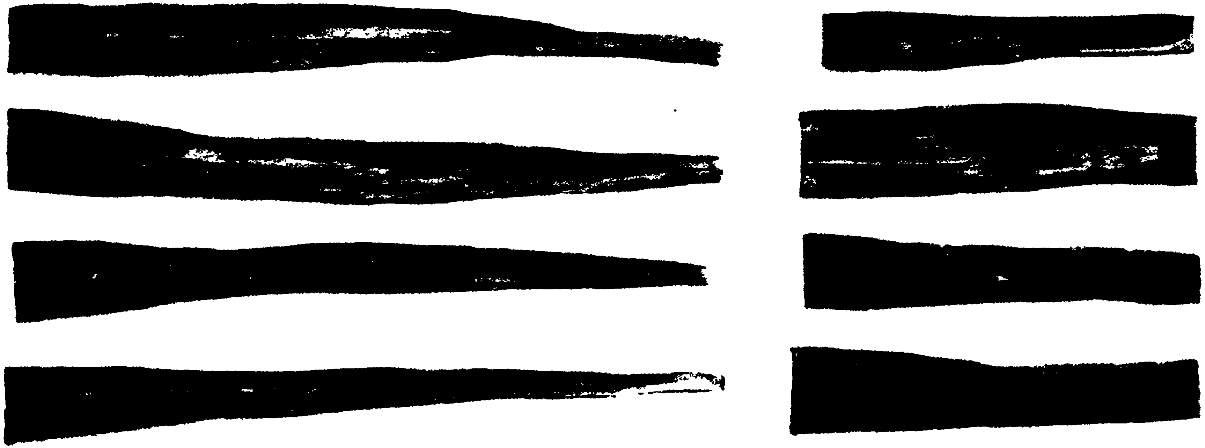

Fig. 35.—*Leaf-stripe Disease of Oats: The Secondary Phase.*

30° C. with an optimum about 20° C. (64° F.). Although growth does not take place at temperatures below freezing point, the fungus is not injured by them, and has been shown to withstand temperatures of 14° C. for eight weeks. It is thus clear that *H. avenæ* is essentially a cool weather fungus,

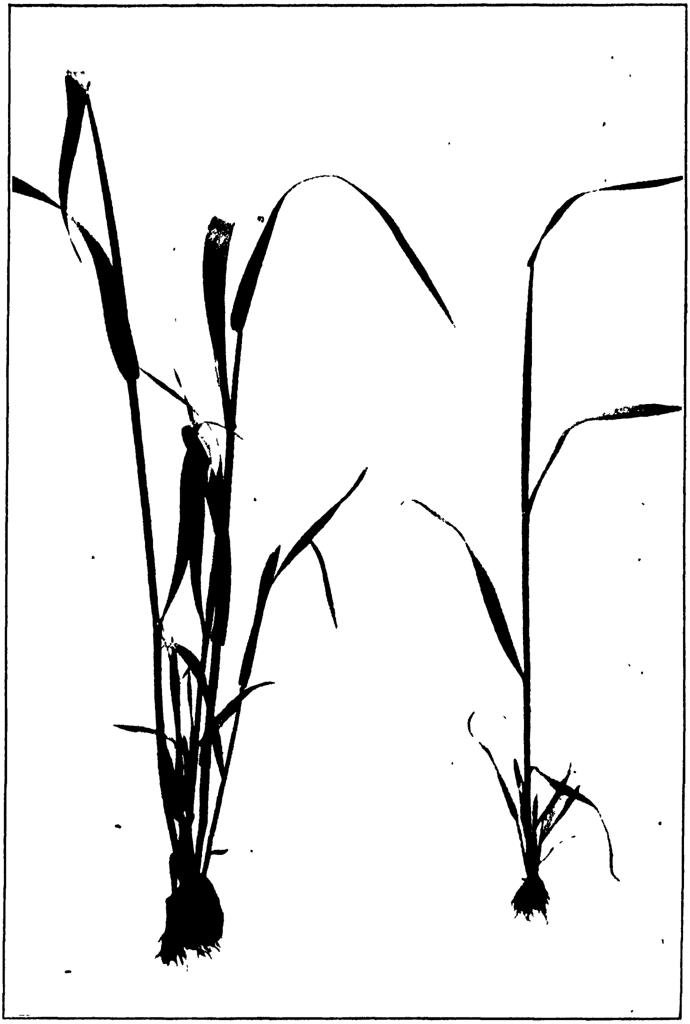

Fig. 36.—A. *Healthy Plant;* B. *Plant attacked by Leaf-stripe Disease in the seedling stage.*

and withstands cold better than its host. Practical application of these facts is seen in the influence of date of sowing on the development of disease in the primary or seedling phase. An experiment at Auchincruive, Ayrshire, carried out with a heavily infected sample of Potato oat, affords interesting information in this respect. Three hundred seeds were sown each fortnight from 3rd September 1931 to 18th August 1932, the work being carried out in a bird-proof cage to prevent raiding by crows. Results obtained are shown in Table 2, where the average soil temperature at a depth of one foot for the fortnight after sowing is also given. The rainfall data were also obtained but no correlation with braird or percentage disease could be detected.

TABLE 2. EFFECT OF DATE OF SOWING ON LEAF-STRIPE DISEASE OF OATS.

Date Sown.	Per cent Braird.	Per cent Disease.	Soil Temperatures.
3. 9.31	75	4·0	53·5° F.
17. 9.31	63	5·9	53·5° F.
1.10.31	76	4·3	53·0° F.
15.10.31	65	1·0	49·0° F.
29.10.31	56	0	45·° F.
12.11.31	31	0	44·5° F.
26.11.31	24	0	43·5° F.
10.12.31	31	0	43·5° F.
24.12.31	34	1·0	43·0° F.
21. 1.32	31[1]	9·4	42·0° F.
4. 2.32	12[1]	3·0	39·0° F.
18. 2.32	36	3·7	39·5° F.
3. 3.32	58	3·5	38·5° F.
18. 3.32	57	1·7	45·0° F.
31. 3.32	64	2·0	43·0° F.
14. 4.32	68	0·98	46·0° F.
28. 4.32	70	1·9	49·5° F.
12. 5.32	72	1·4	52·5° F.
26. 5.32	79	0·4	56·0° F.
9. 6.32	78	0	60·5° F.
23. 6.32	68	0	59·5° F.
7. 7.32	68	0	61·0° F.
21. 8.32	67	0	60·5° F.
4. 8.32	69	0	60·0° F.
18. 8.32	72	0	60·0° F.

Samples attacked by mice after sowing. Percentage unduly low.

The figures show two maxima for seedling infection, namely in January and in September. This is in accordance with general farming experience. There are also two periods in which stripe on the seedling leaves was not developed—viz., *in sowings over a period of six weeks, October to December, and from the beginning of June to the end of August.* Of these the winter period is one where braird and visible stripe decline together. Temperature is low and soil humidity high, conditions known to be relatively favourable to the growth of *H. avenæ* and unfavourable to the development of seedling oats. Obviously at this period all seedlings attacked by the fungus die before reaching the surface, and only the completely healthy ones survive.

With seed sown in late winter and early spring and germinating in spring, the braird gradually improves and the above-ground manifestation of disease reaches its maximum. Environmental conditions remain favourable to the parasite, but are less unfavourable to the development of the host. The seedlings grow more quickly; a number of those attacked succeed in reaching the soil surface and brairding more or less normally apart from the tell-tale stripe. Later in the season, as the temperature of the surrounding soil gradually rises, the balance swings more and more in favour of the host until, in June sowings, braird reaches a maximum and disease disappears. In autumn as soil temperature declines the course of events is reversed. The above considerations show that in practice it is absolutely essential to treat early sown oats; the later in spring they are sown the less damage is to be anticipated from leaf-stripe disease.

It is important to observe that the effect of temperature is shown in its influence on the relationship between host and parasite rather than on the growth of either taken alone. The figures quoted are based on temperatures taken at 9 A.M., but it is improbable that even at noon in summer the temperature below the soil surface rises sufficiently to inhibit growth of *H. avenæ* (83° F.). Its importance lies in the chance afforded to the host of outgrowing the disease. Thus data obtained for the growth of pure cultures of a fungus in the laboratory may yield little information regarding the seasonal intensity of the corresponding disease in the field.

The other important climatic factor influencing the life-history of leaf-stripe disease is atmospheric humidity. This has little effect on the seedling phase, which is characterised by continuous development of the fungus already present within the tissues of the host prior to brairding, but is a controlling factor in its spread by means of spores later in the season. Experiments have shown that spores of *H. avenæ* only germinate when actually in contact with liquid water, and, in the laboratory, a relative humidity of 98 per cent is required for condensation of water around them. Further, it has been demonstrated that when spores are sown on oat leaves no infection results unless a film of dew is maintained. This is probably the reason why disease does not reappear in the oat crop until late summer. After the fourth leaf has expanded and tillering is completed the plant grows rapidly, the shoot elongates and the remaining leaves expand more rapidly than the development of the fungus among the tissues. Although spores are formed readily on the primary lesions, they will be unable to infect new leaves unless moist conditions obtain, suitable for their germination. By the end of July the plants have attained a height of some three feet and the leaves are all expanded. The crop then forms a complete and compact cover over the ground, the air among the plants remains still and protected from the drying influences of sun and wind, and the maintenance of a film of moisture on the leaves becomes possible. Spores derived from the old lesions of the seedling phase alight on the damp leaves, germinate, quickly penetrate the epidermis and set up secondary infection (Fig. 35). From these new lesions fresh spores are produced and the later phase of the disease spreads rapidly throughout the crop, eventually reaching the husk of the developing grain. It is clear that the establishment of favourable conditions for the development of this phase will be assisted by the prevalence of damp cloudy weather and steady rain. Experience shows that the degree of infection of the seed can often be correlated with the rainfall of the month or so preceding harvest. Table 3 indicates a few of the results obtained in examination of samples of pure line Potato oat. The percentage disease is based on examination of the seed. The rainfall figures are taken from the map published in the monthly weather report of the meteorological office and are therefore approximate only.

TABLE 3. INFLUENCE OF RAINFALL ON SEMINAL INFECTION.

Source of Seed.	Per cent Disease.	Approximate Rainfall, August 1930.
Forres, Elgin	4	4-6 in.
Halkirk, Caithness	10	4-6 in.
Ellon, Aberdeenshire	12	4-6 in.
Conon Bridge, Ross-shire . . .	28	4-6 in.
Stonehaven, Kincardine	36	6 in.
Hawick, Roxburgh	36	6 in.
Carlisle, Cumberland	45	6-8 in.
Stranraer, Wigtown	46	6 in.
Mauchline, Ayrshire	52	6-8 in.
Lochmaben, Dumfries	52	8 in.
Hamilton, Lanark	55	6-8 in.

The figures have been chosen deliberately from two widely separated areas, the north-east and the south-west of Scotland, between which the difference in rainfall is constant and well marked. It will be seen that with the damper climate is associated a heavier contamination of the seed with *H. avenæ*. This, at least in part, explains the advantage in the west of Scotland of the long-established practice of 'change of seed'—the introduction of healthier seed from the drier regions of the east and north-east in order to secure an adequate braird. That the superiority of eastern seed is due in the main to its comparative freedom from disease, rather than to any inherent biological factors, is indicated by some interesting experiments carried out at the West of Scotland Agricultural College. In these tests seed from a drier region was compared with that from the south-west, both in the treated and untreated state.

TABLE 4. EFFECT OF SOURCE OF SEED ON DEGREE OF INFECTION WITH *H. AVENÆ*.

Variety.	Source of Seed.	Braird.		Per cent Disease.	
		Treated.	Control.	Treated.	Control.
Marvellous .	Wigtownshire	190	100	0·04	29·4
	Lothians	. .	135	. .	30·1
Victory .	Wigtownshire	213	100	4·4	32·0
	Forfarshire	. .	190	. .	10·3
Victory .	Ayrshire	190	100	0·04	9·0
	Lothians	. .	135	. .	8·3

The figures quoted for braird are relative only and are compared with those for untreated home-grown seed as a standard. The data presented bring out clearly the advantage obtained by introducing seed from the east into the west of Scotland. Clearly, however, in all cases the home-grown grain, when disinfected, gave more satisfactory results than were obtained by change of seed alone. The use of Lothian seed resulted at most in 35 per cent increase in braird, while the number of seedlings showing the primary phase of leaf-stripe above ground is approximately the same as from the home-grown stock. Seed disinfection, on the other hand, gave an increase of 90 per cent in the same experiment.

There is need for caution in interpreting data based on determinations of the degree of seminal infection in different districts: the infection may differ not merely quantitatively but qualitatively also. All persons whose occupation brings them to any extent in contact with living organisms are aware that considerable differences, both morphological and physiological, may exist among the individuals included within the limits of a single species. Fungi are no exceptions to this rule—indeed they are notoriously variable. It seemed possible, therefore, that considerable variation might exist in the degree of pathogenicity of different strains of *H. avenæ* to oats, and, moreover, that less virulent strains might be characteristic of those areas where seminal infection is small. With a view to testing these hypotheses a large number of strains of the fungus were isolated from the samples of pure line Potato oat used in connection with the investigations on the influence of rainfall, already discussed (Fig. 37). These were all grown in pure culture under similar conditions, for the same length of time, and certain of those which showed differences in rate and character of growth, colour, &c., were tested by inoculation into healthy oats. The inoculum was placed between the tips of the husk and the seed sown in pots in the roof garden of the West of Scotland Agricultural College.

Without going into technical details[1] the results of these experiments may be briefly summarised as follows :—

(1) Inoculation of oat seed with pure cultures of *H. avenæ* is sufficient to bring about a marked decrease in braird.

(2) Infection of seed by *H. avenæ* alone will bring about all the characteristic symptoms of the primary phase of leaf-stripe disease, both contorted seedlings and brown striping of the leaves. The contorted seedlings figured in Fig. 34 were obtained in the present series of experiments.

(3) Different strains of the fungus may show marked differences in degree of pathogenicity to oats. One strain reduced braird by 18 per cent only, while another caused 46 per cent loss.

(4) Since all samples of seed used in the experiments received the same amount of inoculum, with such widely differing results when different strains were employed, it is evident that close correlation cannot be expected between figures obtained for natural infection of the husk and those for degree of subsequent primary infection in the field.

(5) Strains having a definite degree of pathogenicity cannot be said to characterise any particular area. Strains from Monkton and Kilmarnock, Ayrshire localities only some seven miles apart, differed markedly in their effect on braird, while of the two most virulent strains one came from Ayrshire and the other from Aberdeenshire.

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[1] A full account of these and other experiments will be found in Bulletin No. 3 of the Plant Husbandry Department, West of Scotland Agricultural College, entitled "Helminthosporium Disease of Oats." 74 pages. 23 plates. 1933.

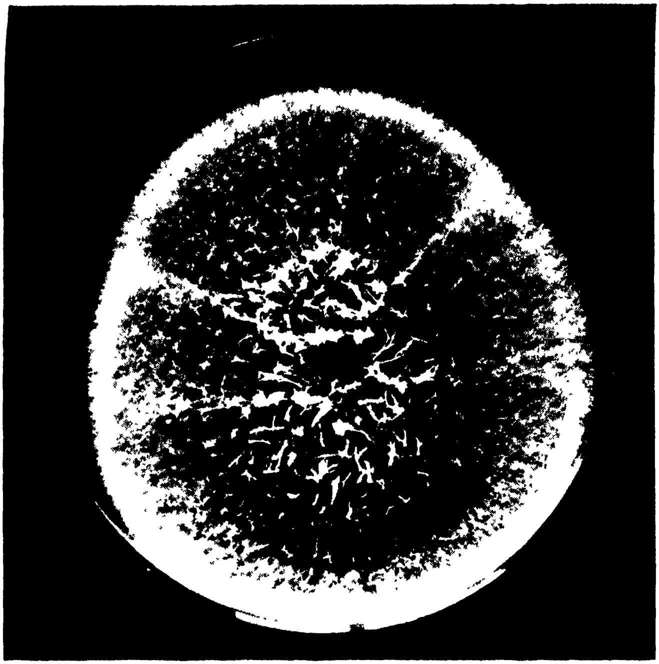

Fig. 37

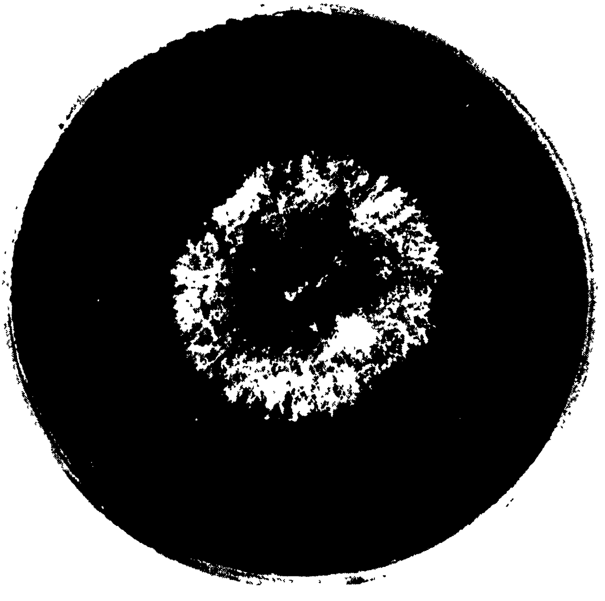

Fig. 38

Fig. 37.—*Pure Culture of* Helminthosporium avenæ *growing on Agar.*

Fig. 38.—*Pure Culture of* Helminthosporium avenæ *growing on soil (sterilised).*

This state of affairs is, of course, only to be expected, since the practice of frequent change of seed would tend to inhibit the development of purely local strains of the parasite.

One more possible source of error must be considered before we can proceed to describe methods of control, namely, the possibility that healthy or disinfected seed may become contaminated from the soil after sowing. The opinion has been advanced by certain farmers that leaf-stripe appears in greater abundance in the case of seed sown on land which had borne oats the preceding year. This, if true, might be due to the overwintering of the fungus on straw or stubble, or might indicate its ability to grow as a saprophyte in the soil after the removal of its host. Experiments to investigate the possibility of the second alternative were carried out by us in 1932. They show that, while *H. avenæ* is capable of growing well on soil which has been thoroughly sterilised before being inoculated (Fig. 38), it is quite unable to grow on unsterilised soil. The implication is that the normal soil fungi, whose number is legion, compete so strongly with *H. avenæ* as to crowd it out in unsterilised soil. It cannot, therefore, be assumed to occur growing freely in ground which has borne a diseased crop. To further test this conclusion, fragments of a pure culture of *H. avenæ* growing freely on sterilised soil were planted among, but not in contact with, disease-free oat seed, under conditions favourable for the development of leaf-stripe symptoms. No trace of disease resulted on the seedlings, showing that the fungus was incapable of growing through the short space of soil separating it from the germinating seed. If, therefore, the above opinion of farmers has any foundation in fact, it must be explained on the basis of resting Mycelium passing the winter on ploughed-in stubble. It is fair to state, however, that on land at Auchincruive, where three oat crops have been taken in succession, there is absolutely no evidence of an increase in intensity of primary infection in later years.

It follows that the effective source of disease is to be sought in the husk of the seed, and on this fact the success of seed disinfection depends.

The earliest experiments on the control of leaf-stripe of oats in Scotland were carried out by O'Brien and Prentice when the dry treatment was in its infancy. They were designed to test the efficacy of a number of organic mercury preparations as compared with the standard formalin treatment. A progress report of this work was published in 1930,[1] in which the conclusion was drawn that "effective control of this disease can be brought about by using any of the liquid organic mercury compounds like Uspulun and Germisan and that almost as satisfactory results can be secured by using Ceresan, which being in the form of a powder specially designed for dry treatment makes a strong appeal to the practical farmer. . . . The average increase in establishment of plants due to seed treatment for eight centres is 91 per cent. In other words there were practically twice as many plants on the treated section as there were on the untreated; and further, the percentage of plants affected with leaf-stripe was twenty-eight on the latter compared with four on the former. In every case the braird on the treated section was much healthier, more uniform and more vigorous than that on the untreated section. Frequently the difference in the two sections could be seen at a distance of over a mile."

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[1] O'Brien, D. G., and Prentice, E. G., 1930: "Leaf Stripe or Yellow Leaf of Oats." 'Scottish Journal of Agriculture,' 13, 272-283.

The efficacy of the dry treatment having thus been demonstrated, subsequent experiments were confined to the use of various dusts. Of these the earliest were of German origin, notably the now famous Ceresan, but after the possibilities of this type of product became apparent firms in this country hastened to manufacture rival preparations, several of which are now on the market. Such of these as incorporate organic compounds of mercury have proved as efficient as Ceresan. Specially noteworthy in this connection are Agrosan and Leytosan, both of which have been extensively tested by us and may be confidently recommended as adequate seed disinfectants. Data were obtained with these products in experiments on a field scale at a number of centres in 1933, and the results at two typical farms are presented in Table 5.

TABLE 5. FIELD EXPERIMENTS WITH DRY SEED DISINFECTANTS IN 1933.

Variety of Oat.	Locality.	Braird as per cent of Untreated Plot.				Per cent Disease.			
		Control.	Leytosan.	Ceresan.	Agrosan.	Control.	Leytosan.	Ceresan.	Agrosan.
King	Auchincruive	100	132	142	142	15	4	0	2
Ascot	Dalbeattie	100	144	147	136	18	1	3	2

We do not consider these experiments sufficiently extensive to enable us to express an opinion as to the relative merits of the three preparations quoted. On the contrary, we regard them as likely to prove equally efficacious in any given case. It should be mentioned that the more progressive firms are continually experimenting with new compounds, with the result that their preparations tend to improve in calibre each year, even without a corresponding change of name. Thus, quite apart from the influence of seasonal factors, it is unfair to compare results obtained with, say, Ceresan of one year with those given by, say, Agrosan of another. The rate of application of these dusts to the grain is usually recommended as 2 oz. per bushel, and this is confirmed by experiments with Agrosan quoted in Table 6.

TABLE 6. RATE OF APPLICATION OF DISINFECTANTS TO GRAIN PER BUSHEL.

Dust.		½ oz.	1 oz.	1½ oz.	2 oz.	2½ oz.	3 oz.
Agrosan	Braird	102	104	108	117	102	114
	% Stripe	1·0	1.5	1·5	1·5	0·7	0·6

Comparable results were obtained with Ceresan.

In this Table again the braird on the untreated control plot has been put at 100 and the figures for the treated sections calculated on this basis. The control plot showed 13 per cent disease on the first leaf.

Since the most conspicuous result of elimination of leaf-stripe disease is a thickening of braird, due to the appearance above ground of those seedlings which would otherwise have perished from pre-emergence blight (p. 93), it is clear that to obtain a given density of crop less seed need be sown if seed treatment is practised. In the case of heavily diseased seed, reduction in rate of seeding by ¼ or even ½ is advisable. The results of some scattered experiments bearing on this point have been collected in Table 7.

TABLE 7. RATE OF SEEDING WITH DISINFECTED GRAIN.

Variety.		Disinfected : Bushels per acre.			Control : Bushels per acre.		
		6.	5.	4.	7.	6.	5.
Marvellous	Braird	149	140	129	94	100	..
	% Stripe	0·8	0·5	0·5	24·2	19·0	..
Victory	Braird	143	..	129	..	100	..
	% Stripe	9·5	..	7·0	..	24·2	..
Yielder	Braird	129	..	..	..	100	..
	% Stripe	?	..	..	..	30	..
Ascot	Braird	..	177	..	126	..	100
	% Stripe	..	0	..	4·0	..	9·0
King	Braird	109	96	82	..	100	..
	% Stripe	0	0	0	..	13·0	..

It should be pointed out that the foregoing figures are for establishment of individual plants at about the time of appearance of the third or fourth leaf. They take no account of the allowance to be made for thickening of the crop due to tillering. It has been shown above (Table 1) that plants showing the primary or seedling symptoms of leaf-stripe disease do not produce healthy tillers, whilst healthy plants may be expected on the average to mature at least two tillers each. In this respect, of course, oat varieties differ greatly, but as a result of the operation of this factor a somewhat thinner original braird from disinfected seed will tend to thicken and yield more heavily than a thicker one from diseased seed.

Certain of the larger firms of seedsmen operating in Great Britain have been so impressed by the results obtained by disinfection of oats that they offer their seed in the treated state without extra charge. Probably this practice will be more widely adopted in the future, but for many years to come there is likely to be a number of farmers who, for various reasons—*e.g.*, the use of home-grown seed, may prefer to perform the process of disinfection themselves. With the dry preparations all that is required is an intimate mixing with the grain at the rate of 2 oz. per bushel. This must be done so thoroughly that a film of the powder completely coats each individual grain. For this reason the practice of spreading the corn on the floor of a barn, scattering the disinfectant on the heap and turning over three or four times with a spade, is not satisfactory. Much of the powder is lost under such conditions, and the grains are inadequately coated.

The actual mixing process should, therefore, be carried out in some form of closed container which can be rapidly rotated. A number of vanes should be inserted on the inside in order to thoroughly mix grain and disinfectant during the rotation of the receptacle. It is not necessary to invest in expensive apparatus; an old end-over-end butter churn is well suited for the purpose. When such is not available, or is retained for less ignoble ends, quite satisfactory results can be obtained with a barrel fitted with a handle at one end and slung between two supports so as to be rotated around a horizontal longitudinal axis. A hole of suitable size, which can be readily opened or securely closed at will, must be cut in the side for filling and emptying the receptacle (Fig. 39).

For those who have to deal with larger quantities of grain and who do not wish to have to measure out the prescribed quantity of powder each time the churn is filled, more complicated machines are now on the market. These consist mainly of a cylindrical horizontal drum in which the grain is rotated after receiving the appropriate quantity of disinfectant. The latter is supplied from a small container fixed to the side of the hopper from which the grain is fed into the drum on rotation. A serious fault existed in the older machines since it was found in practice that there was a distinct tendency for the powder to cohere and clog the opening into the mixing drum. The most improved machine of this type, therefore, contains a forced feed in the form of a piston working at the base of the container. At each rotation of the drum the piston forces into it the appropriate amount of powder. In addition, the mixer is so designed that the amount of powder added is maintained in the same proportion to the amount of grain entering the drum, irrespective of the rate of rotation. Such machines can deal with some 15 cwt. of grain per hour and cost about £8. Full details are given in an article in the Scottish Board of Agriculture's Journal, 1932.[1]

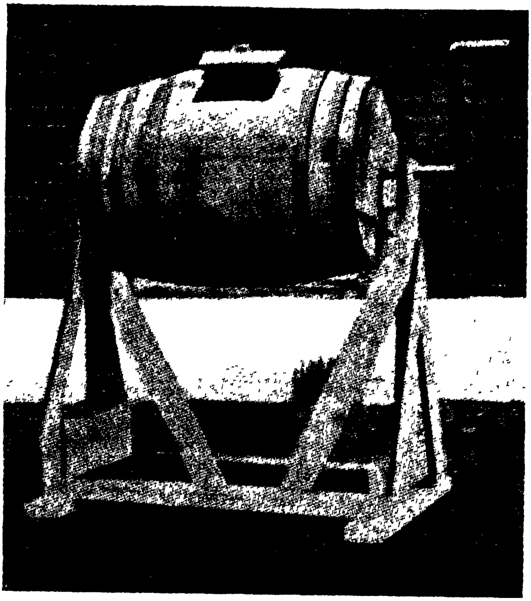

Fig 39.—*A simple Barrel mixer.*

Since the active principle in all the modern preparations for disinfection of cereals is some compound of mercury, a certain amount of care is necessary in their use, mercury being a very dangerous poison. Fortunately a number of circumstances combine to reduce the danger of mercury poisoning from this source to a minimum. In the first place, the modern preparations have a slightly greasy feel, owing to the addition of an oily substance which not only helps to make them adhere more thoroughly to the grain but also makes them less 'dusty,' and less liable to be spread by air currents than is, say, Copper Carbonate powder. Secondly, such a dust as Ceresan or Agrosan contains only about 2 per cent of the mercurial compound, the remainder of its bulk being composed merely of 'filler' or 'spreader.' Thirdly, provided the mixing is done in a closed container, as recommended above, there is very little opportunity for the powder to escape into the air and affect the eyes, nose or lungs of the operator. Indeed, in our experience one is likely to suffer more discomfort and danger to health from the average Glasgow fog than from modern seed disinfectants.

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[1] O'Brien, D. G., and Dennis, R. W. G., 1932: "Control of Leaf Stripe or Yellow Leaf of Oats." 'Scottish Journal of Agriculture,' Vol. xv., 1-6.

Certain individuals, however, appear to be particularly susceptible to the irritating effect of these powders. Where this is the case, and as a matter of routine where very large quantities of grain have to be treated at one time, some precautionary measures against inhaling the dust are advisable. A considerable degree of protection may be derived from a wet handkerchief or cloth tied over the mouth and nose, or an inexpensive mask of the type shown in Fig. 40 may be worn. A special precaution recommended to those troubled by weak eyes is to wear motor goggles during the actual mixing process.

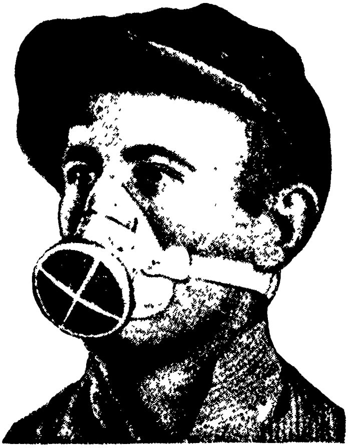


Fig. 40.—*Mask for use when disinfecting large quantities of grain.*

In view of the poisonous nature of the compounds employed in dry seed disinfectants it is natural that some uneasiness should arise regarding the after use of sacks which have contained disinfected grain. Little anxiety need, however, be entertained on this head in view of the exceedingly small amount of the active ingredient contained in the powder. Such a dust as Ceresan contains only about 2 per cent of a complicated organic compound of mercury and is used at the rate of 2 oz. per bushel of grain, weighing about 42 lb. A sack of grain weighing 1½ cwt. will, therefore, require 8 oz. of disinfectant containing $\frac{8}{50}$ oz. of the mercury compound. Carefully conducted tests, in which all dust was extracted from the unshaken canvas bags by a powerful vacuum cleaner, show that only about 1 per cent is retained by the bag after the grain has been emptied out. This will include only $\frac{8}{5000}$ oz. or $\frac{7}{10}$ grain of the mercury compound. In the event of the sack being refilled with grain at harvest it is extremely improbable that as much as 50 per cent of this retained dust, including $\frac{7}{20}$ grain of poison, will become attached to the 1½ cwt. of oats. Even if such is the case, the cleaning by sifting and blowing, which such grain may undergo prior to its being ground into flour, would suffice to remove the extremely minute quantity of disinfectant still present. Further, in the manufacture of oatmeal practically the whole of the powder would be removed with the husk.

PARASITIC WORMS AND THEIR IMPORTANCE IN SHEEP-FARMING.

By J. B. ORR, M.D., D.Sc., F.R.S.; ALLAN H. H. FRASER, M.D., B.Sc., Rowett Research Institute, Aberdeen; and DAVID ROBERTSON, Ph.D., B.Sc.(Agr.), N.D.A., North of Scotland College of Agriculture, Aberdeen.

INTRODUCTION.

PROFESSOR T. W. M. CAMERON, talking to the British Association last year, calculated that the losses from worm infestation of farm animals, in Great Britain alone, resulted in a yearly loss of ten million pounds, and that ten per cent of the country's sheep mortality is due to the same cause. While these figures are necessarily estimates, they stress the very real economic importance of parasites in stock-farming, an importance which is universally admitted by those who have made a special study of the subject.

In recent years the problem of parasitic worms in sheep has apparently become more serious, and over wide areas of Scotland farmers are concerned with the resulting losses, and by systematic dosing and other means have already taken active means to combat the pest. In many cases drug treatment has not yielded the results expected of it, and it therefore appears useful to review the whole question in the light of the most recently acquired knowledge and in relation to other aspects of sheep husbandry.

THE THREE TYPES OF WORM.

Three main types of parasitic worms are found in sheep: the flatworms or Trematodes, of which the liver-fluke is the important example; the tapeworms or Cestodes, passing white segments in the sheep's dung which are visible to the naked eye; and finally the roundworms or Nematodes, which are themselves small and whose eggs are of microscopic size.

The liver-fluke and the disease it causes are now too well known to require description. Carbon tetrachloride capsules have proved themselves an effective remedy when used in time, and when the proper precautions of first testing a small number of the flock and withholding concentrates during treatment have been observed.

Less is known of the tapeworms. These are the worms which give rise to the white segments containing ripe eggs which are so commonly observed in fresh sheep's droppings. Their life-history is still obscure, and their economic importance uncertain. It is known that prime fat sheep may contain many tapeworms, and the deduction has been made that tapeworms are therefore harmless. This deduction is scarcely justified by the facts, and it is perhaps safest at the present time merely to admit that a sheep may harbour many tapeworms and yet be fat. Under conditions of poor nutrition it is conceivable that heavy tapeworm infestation of lambs may lead to an ill-thriving condition, as many farmers believe, and with the meagre knowledge as yet at our disposal it would be premature and wrong to discount the possibility.

There are, however, no two opinions about the economic importance of the Nematodes or roundworms. That they may cause an ill-thriven condition or even death in lambs is universally admitted. Experience and experiment in Britain, America, Africa, Australia and New Zealand have shown that roundworms may not only make sheep-farming profitless, but actually render it impossible.

There are many kinds of roundworms parasitic in sheep. No less than eighteen species have actually been found in Scottish sheep. Some of these are rare, of others but little is known, but there are two of known importance and life-history which may serve as types for the rest. One is the twisted wireworm (*Hæmonchus contortus*), which may be seen as a red and wriggling thread on the wall of the fourth stomach of a newly killed sheep. The other is the lesser stomach worm (*Ostertagia circumcinta*), which is very much smaller and is very much more difficult to find, but nevertheless can be seen without the microscope's aid.

LIFE-HISTORY OF ROUNDWORMS.

The life-history is roughly similar in both species. Adult fully-grown male and female worms live in the folds of the lining of the sheep's fourth stomach, which is that division nearest the small gut. There they mate together, and as a result of that mating each female lays many thousands of microscopic eggs. These eggs fall into the food in the sheep's fourth stomach, pass right down the whole length of the sheep's gut, and are excreted with the sheep's droppings on to the ground. There the eggs hatch out. At first the young worms feed on the droppings. They then wriggle away from the droppings and burrow into the soil, or climb up blades of grass. When the grass is eaten the young worms are eaten too, and pass into the sheep's stomach. In the

Fig. 41.—*The twisted wireworm* (Hæmonchus contortus) *lying in the folds of the fourth stomach of a lamb.*

About natural size.

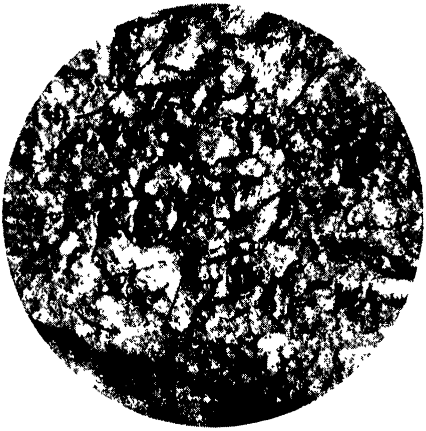


Fig. 42.—*The lesser stomach worm* (Ostertagia circumcinta) *attached to the lining of the fourth stomach.*

Twice natural size.

fourth stomach, and there only, they become attached to the lining and grow into adult male and female worms.

There are several important practical points in this life-cycle. In the first place worms do not multiply within a sheep. If a sheep contains, let us say, five thousand worms in its fourth stomach, then each of these worms has been taken in with the sheep's food. Secondly, a lamb can only become infested with worms if it grazes on grass or eats other food which has been contaminated with sheep's droppings. Therefore the more sheep's droppings there are on a field of grass, the more likely are lambs to pick up worms. Thirdly, if the young worms are eaten by horses, pigs, rabbits, hares and possibly cattle, they will die in these animals' stomachs. To reach maturity they must find the fourth stomach of a sheep or a goat, because no other home will suit them.

Those are important facts which have been definitely proved. There are others equally important about which doubt exists. Suppose a field is cleared of sheep, how long will it be before all the worms and worm eggs on that field are definitely dead and no longer capable of infecting sheep? The answer has been given as ten months, but it is probable that the figure depends on weather conditions. One thing is certain. If a grass field is ploughed up and put under an ordinary rotation, there will be no worms or worm eggs on the new grass when it is sown down. A young grass field is a clean field as far as worms are concerned. On the other side of the picture, an old grass field that has been well sheeped will be full of young worms and eggs. But even a young grass field may become rapidly infected because of the enormous fertility of worms. In one experiment by Stoll, two lambs excreted 456,600,000 worm eggs in 119 days, which works out at some 44 per second. A ewe may excrete 10,000,000 eggs a day. It is obvious that with heavy stocking even young grass may quickly become a source of danger.

THE SIGNS OF WORMS IN SHEEP.

All sheep contain worms. In Nature there is no such thing as a worm-free sheep. Before any damage is done the worms must be numerous and the sheep must be young. It is not yet known how many worms of any given kind are necessary to produce disease in a lamb. It is possible that the number must be very large in a healthy well-grown lamb, and much smaller in a lamb thriving badly from some other cause. Various estimates have been made from time to time, but there is no definite knowledge on the subject. On the other hand, it is certain that adult sheep can carry very large numbers of roundworms without suffering serious ill effects.

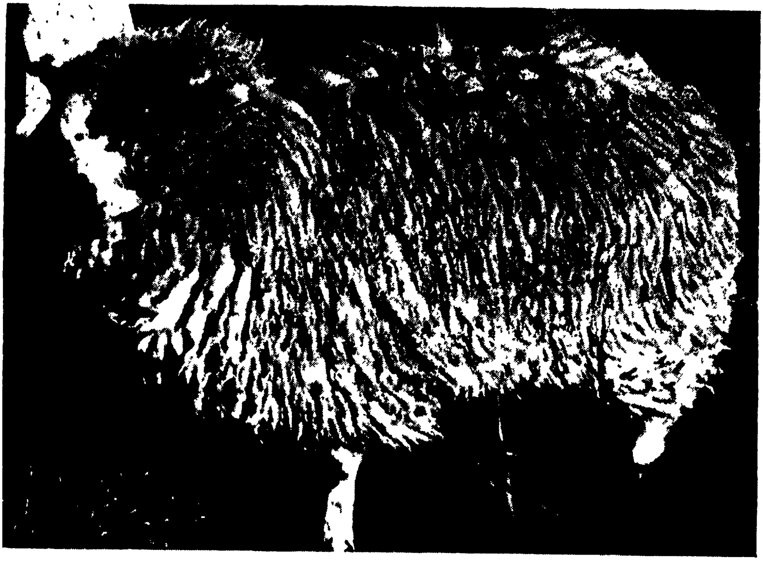


Fig. 43.—*Grey face lamb (6 months old) in dying condition.*

Fourth stomach contained 18,000 lesser stomach worms. Death probably due to worm infestation.

Fig. 44.—*Suffolk Cross lamb (6 months old) in dying condition.*

Fourth stomach contained 7000 lesser stomach worms. Death possibly due to some disease in the nature of pine and not to worm infestation.

The importance of ewes in relation to the worm problem is that they infect the pastures where their young lambs graze.

The lamb, then, is the important animal. How can one tell when lambs are worm-infested? The general story is that they are not doing so well as they should, giving due consideration to breeding, feeding and management. They eat a lot without putting on weight, they handle badly, their coats are dry and without bloom, and they usually scour. Even more characteristic than thinness is the fact that they are weak. They are far too easy to catch and to hold. If the upper eye-lid is turned up, it will be seen to be pale and bloodless, and there may be matter oozing from the inner corner of the eye. In technical language the symptoms are those of emaciation, anæmia, and diarrhœa.

Unfortunately, there are certain other diseases which give rise to very similar appearances. There are the nutritional deficiencies, and particularly pine, in which the lambs go back during the summer in much the same way. Again, lambs pining from any cause are thin, bloodless and scoured. It is not easy to go into a field of lambs and say with certainty that they are or are not suffering from worms. Examination of the sheep's droppings will only reveal the tapeworm segments. By far the best thing is to have a lamb killed, the stomach contents examined by a competent expert, and the number and kind of worms present actually ascertained. This information, combined with the appearance of the lambs themselves, will usually give the information required.

How Worms Produce Disease.

There are three possible ways in which roundworms may produce signs of disease—(1) by sucking blood; (2) by setting up inflammation of the stomach and so interfering with digestion; (3) by producing substances which poison the sheep. A consideration of these various points would involve much technical discussion and a judgment on many controversial views. It seems safe to say of the three possible causes that the actual loss of blood is least important, the local damage to the stomach of variable significance, and the production of poisons most serious of all.

How Sheep Resist Worm Attack.

Every young worm that reaches a sheep's stomach does not necessarily develop into an adult worm. The number of ingested worms that survive depends greatly on the sheep. Individual sheep of the same breed and in the same flock differ widely in this respect. There are individual sheep which appear to have a very great natural resistance to worms; there are others which are easily infested. It is probable that every sheep has the power, in varying degree, of destroying a proportion of the worms which reach its stomach.

Sheep also vary in their power of resisting the effect of the poisons produced by the worms which have succeeded in gaining a footing in their stomach. Older sheep may not be seriously affected although they may contain a very large number of worms. It is possible, although unproved, that one lamb may be gravely poisoned by say 5000 worms, whilst another lamb of the same age and breeding may be unaffected by a similar number.

This natural resistance of sheep to worm attack is of the first importance. Resistance is known to increase with advancing age and to be decreased by poor nutrition. Nutrition is important in two ways. In the first place good nutrition decreases the number of worms which gain a footing in the sheep's stomach. Secondly, and probably even more important, good nutrition increases the sheep's power of resisting the effect of the worms' poisoning influence. It is possible that some elements in the diet may have a greater effect than others in increasing resistance to worms. For example, since anæmia is such a notable sign of worm infestation, the importance of abundant iron in the diet is probably great. Again, certain of the vitamins are known to have a special influence on the muscular tone of the gut wall and on the health of its lining membranes. Their absence or insufficiency might very possibly favour the worms. These suggestions, however, are speculative. What *is* certain is the beneficial effect of feeding concentrates to lambs. Many farmers have found this through their own experience, and place greater reliance on the feeding trough than on the drug bottle in the treatment of their lambs.

THE SEE-SAW RELATION OF SHEEP AND WORMS.

Even wild sheep have worms. Every domesticated sheep of all breeds is more or less affected. No worms, no sheep, is a perfectly true statement, and it is equally true that without sheep there could be no sheep worms. When a worm-infested sheep dies the worms it contains die with it, and worm disease is as much against the interests of the worm as against those of the sheep or flockmaster.

Through long ages there has been a balance established between the sheep and its parasitic worms. There should be an exact balance between the poisoning effect of the worm and the natural resistance of the sheep. Death from worm infestation is a biological accident, an upsetting of the see-saw balance between sheep and worms. The scales may be dipped in two ways: either by an excessive increase in the number of worms, or by a lowering of the resistance of the infested sheep. What very often occurs is that both things happen together, as in the back-end of the year when pastures become foul with worms and lambs lose condition through the decreased feeding value of the pasture. The aim of the flockmaster is, therefore, to maintain the natural balance, by decreasing the number of worms on his pastures, by increasing the health and resisting power of his sheep, or by both these measures.

METHODS OF CONTROL.

Carbon tetrachloride capsules have proved an effective remedy in the control of liver-fluke. There is evidence that the losses caused by this disease have been greatly lessened since an effective medicine was discovered by Montgomery in Wales. It was therefore natural that attempts should have been made to find a drug capable of destroying roundworms in a similar way inside the sheep. Energetic research in South Africa led to Veglia's discovery of the copper sulphate treatment which has since been widely used in all parts of the world, and is the basis of most proprietary sheep-worm remedies. In Scotland copper sulphate has not given the very good results which were obtained in South Africa. Many flockmasters found only slight benefit resulted from its use. Robertson, of the North of Scotland College of Agriculture, investigated the matter in his College area, and was able to discover the reason for the relative ineffectiveness of copper sulphate in Scottish sheep. In South Africa and in Australia the most prevalent type of sheep worm is the large twisted wireworm (*Hæmonchus contortus*), which is very effectively removed by copper sulphate treatment. Now, Robertson found this worm was present in but small numbers in lambs from the north-east of Scotland, but that another worm, the lesser stomach worm (*Ostertagia circumcinta*), was exceedingly prevalent, and an evident cause of losses on certain farms examined. Unfortunately copper sulphate is not an effective remedy against the lesser stomach worm; indeed no really satisfactory drug has yet been found for its control. Much work has been and continues to be done in efforts to find an effective drug, but until such is found no great reliance can be placed on medicinal control of worms in Scottish sheep.

In seeking to find other methods of control Robertson devised a system of rotational grazing, by which ewes and lambs were shifted on to fresh unsheeped pasture at intervals of ten days, and not allowed to return to any pasture area which had once been grazed. The intervals were fixed at ten days because that is the time it takes a worm egg to hatch out and develop to the young stage capable of infecting sheep. He showed, quite conclusively, that this system of progressive grazing did lead to a considerable reduction in the number of worms picked up by lambs. The practical difficulty of this system is, of course, that it is seldom if ever possible to graze sheep once over a pasture and then leave it unsheeped for the rest of the season. This experiment, however, conveys some valuable lessons, and suggests at least one of the reasons why ewes and lambs do so very much better when kept constantly on the move.

Cattle can be used as traps for sheep worms. The young worms they swallow do not usually develop any further, but are killed in their stomach and gut. Many sheep worms are destroyed where cattle or horses graze, and mixed grazing is from this, as from many other points of view, preferable to the grazing of sheep alone. Perhaps even better than mixed grazing is alternate grazing, where sheep follow cattle and cattle follow sheep. A herd of cattle will do more to clean up sheep pasture than many a shower of rain.

Sheep Worms and Methods of Husbandry.

Speaking generally, it may be said that in the absence of an effective drug, sheep-worm control must largely depend on the system of husbandry adopted. It is often difficult or impracticable to alter a system of farming to control one disease. It may often pay better to go out of sheep temporarily and try something else. The relative profitableness of sheep in recent years has made farmers unwilling to adopt this latter course, and it is just the fact that sheep have been more profitable, or less ruinous, than cattle and crops that has led to an increase in the range and intensity of worm infestation of sheep.

Over-stocking and *under-ploughing* are the two root causes of the upsetting of the balance between sheep and their parasitic worms. Because for some years sheep paid better than most farm enterprises, there was a real inducement to over-stock and risk killing the beast which carried the golden fleece. Sheep were introduced to many districts and counties where they had previously been known mainly as winter visitors. They did extremely well on the clean fresh ground; so well, indeed, that farmers were induced to stock and over-stock until there were too many sheep for the ground, and too many worms for the sheep.

When grass is ploughed up and put under rotation, all worms and eggs will have died out before the new grass is sown. But recently, in order to maintain pasture area for sheep and to lower labour expenses, less land has been ploughed than ever before.

These two things, over-stocking and under-ploughing, both expedients of an agricultural depression in which sheep were slow to share, have combined to give the parasitic roundworms an unfair advantage over the sheep in which they spend part of their lives.

There are certain systems of sheep husbandry in which worms are unlikely to be a serious problem. Thus on hill grazings, carrying a reasonable stock, worms are unlikely to become a serious menace, although it is surprising how many worms a hill lamb may sometimes contain.

At the other end of the agricultural scale is the classical English system of sheep-folding, where by a system of moveable hurdles and specially grown arable crops, the lambs always obtain a fresh bite in front of the ewes. There, also, worms are unlikely to be a problem.

It is in the systems of intermediate intensity of cultivation that worms have their opportunity. Permanent pasture and lengthened rotations, with a soil sufficiently fertile to carry a large head of stock to the acre—those are the conditions most favourable to sheep worms, and are also the conditions under which experience has shown that losses from worms are most likely to occur. The older the grass the greater the number of worms it shelters, and the greater its age the less its nutritive value becomes. The increased number of worms ingested, combined with the poorer nutrition of the sheep, tips the balance in favour of the worms, and losses among sheep are sure to occur. One way out of the difficulty is to decrease the age of the grass and the number of sheep. Another method is to aim at getting the lambs away fat as early as possible in the season, by early lambing and the judicious use of concentrated feeds. In spring and early summer worms are not so serious a problem as in late summer and early autumn. Finally the sheep may be sold off and cattle substituted for a number of years, when sheep can safely return.

Before making any change in husbandry methods it is well to make certain that the poor condition of the sheep is actually due to worms and to no other cause.

SOME UNSOLVED PROBLEMS.

There is great difficulty in deciding when the poor condition of lambs is definitely due to worm infestation. The signs of infestation are not always clear cut or easily distinguishable from other causes of bad thriving. Even when lambs are found by post-mortem examination to contain a large number of worms, this question always remains to be answered. Is the diseased condition due in the first place to heavy worm infestation, or is that infestation a result of the unthrifty condition and lowered resistance of the sheep, brought about by some other cause ? Briefly, is the horse before the cart or the cart before the horse ? It is certain that early investigators paid too much attention to the numbers of worms on pasture and too little to the capacity for resistance of the grazing sheep.

How many worms are required to kill a lamb ? Robertson, from the results of his investigations in the north-east of Scotland, concluded that it required more than 10,000 of the lesser stomach worm to produce death, since the lambs he found dying contained over that number. Workers in other countries have given other figures, sometimes very much lower. Of course, it is common sense that a weakly lamb will die from the results of a smaller infestation than one which is strong. Again, since lambs vary enormously in their resistance to worms, there must be a corresponding variation in the number of worms necessary to kill. It is probably impossible, and certainly premature, to give any definite figure at all. There is a great deal of work to be done in finding out the number of worms harboured by lambs under different conditions. There is too little information available regarding the numbers of worms in healthy lambs compared with that in those that are sick.

There is the question of species distribution. Are the same kind of worms responsible for damage in all parts of the country, or are there worms thought harmless which may be harmful under certain conditions and in certain districts ? Has the loss caused by worms been under-estimated or overstressed ? Is the worm problem sometimes overlooked, or is disease put down to parasites when it is due to other causes ? Are there certain types of soils and climates which favour worms ? Which is the more important, the number of worms or the sheep's resistance ? There are a hundred and one similar questions which cannot be answered by the knowledge available, and which point the way to further research.

Lines of Research.

In order to obtain further information, a joint research between the North of Scotland College of Agriculture and the Rowett Research Institute was begun in the summer of 1933. The first point to discover was the extent and severity of worm infestation in Scotland; to determine the degree to which Scottish sheep were affected by worms and the measures already taken by farmers for their control.

The first step taken was to post questionaire forms, covering letters and stamped envelopes for return, to 857 breeders of pure Border Leicester, Cheviot and Blackface flocks, and to 768 breeders of commercial sheep. Of course, many of the pure breeders also owned commercial flocks. The names and addresses of the pure breeders were obtained from the secretaries of the pure breed sheep societies, and of the commercial breeders from the county agricultural organisers and auction companies. It is a great pleasure to return thanks to the ladies and gentlemen who gave us such willing and valuable help.

The number of commercial breeders circularised was proportional to the sheep population of each county. For example, forty-one and fourteen addresses were circularised in the counties of Berwickshire and Kincardineshire, the sheep population of these counties being 410,000 and 140,000 respectively.

Of the 545 completed forms returned, 295 reported losses from suspected worm infestation. It is hoped to visit as many of these farms as possible within the limits of time and money available.

The scope of the survey is confined to lambs between three and ten months, for the reason that only young sheep suffer to any extent from parasitic disease. Thirty-five farms were visited during the summer of 1933. In order to obtain an immediate bird's-eye view of the situation, a wide area was covered. Farms were visited and material obtained from the counties of Ayr, Wigtown, Kirkcudbright, Dumfries, Lanark, Dumbarton, Stirling, Angus, Aberdeen, Inverness, Ross, Sutherland and Caithness. In all, a total of twenty-three sheep were examined. At each examination the lungs, liver and gut were inspected by naked eye, while the contents of the stomach, small gut and large gut were separately bottled and preserved and taken back to the laboratory for closer inspection and individual counting of worms.

The history of each lamb was obtained and noted; perhaps the most valuable part of the work was the opportunity for personal discussion with flockmasters themselves. The survey will be continued, and if possible completed, during this summer, when the full results will be available for publication. In the meantime certain conclusions have already been arrived at.

In the first place the earlier work of Robertson in north-east Scotland has been amply confirmed. The twisted wireworm (*Hæmonchus contortus*) does not seem to be a serious pest in Scotland. Other worms, particularly the lesser stomach worm (*Ostertagia circumcinta*) and several small gut worms, were found to be far more numerous, and in many cases the probable cause of disease.

Two worms, *Ostertagia ostertagia* and *Cooperia oncophora*, were for the first time recorded in Scottish sheep.

Many of the lambs examined had been systematically dosed throughout the summer with the commoner drugs, such as copper sulphate and carbon tetrachloride. While these drugs may have reduced the number of twisted wireworm, which were never numerous in dosed or undosed sheep, they had certainly had but small effect on the lesser stomach worm, which were found to be numerous even after repeated dosing. The general impression derived from the survey was that dosing is unsatisfactory, and is not giving results commensurate with the labour involved.

On several farms visited, it appeared that the loss among lambs attributed to worm infestation was due to some quite other cause. Neither the system of farming nor the history of the trouble suggested worms, and the number of worms found in the lambs' stomachs was not above normal. It is certain that several farmers had been dosing their lambs for worms, often over a period of years, when the ill-thriven condition of their lambs was due to some other disease in the nature of pine.

It is certain that the menace of worm infestation among sheep in Scotland has not been overlooked, perhaps rather the reverse, and that the common remedies are both widely known and conscientiously employed. The trouble seems to lie in the fact that drugs are relatively ineffective against the type of worm most prevalent in Scotland, and that there are widespread areas where lambs are pining from some cause other than worms. Fine, fat, fertile farms are producing lambs which are skeleton lean; and whether the cause is worms or not, no stone must be left unturned in an effort to find a cure.

EXPERIMENTAL OAT AND POTATO BREEDING.

SOME RECENT DEVELOPMENTS.

By **WILLIAM ROBB**, Director, Scottish Plant-Breeding Station, Edinburgh.

SINCE the beginning of this century much progress has been made in the study of heredity. This study has a very definite bearing on the improvement of plants, and the growing realisation of its importance is reflected in the many plant-breeding stations which have been instituted within the last forty years. The national importance of improving crop plants is now generally appreciated, and, as a result, experimental breeding is being conducted both intensively and extensively in many parts of the world. In some countries in which there are large areas of arable land, plant-breeding stations are to be found in several different districts, so that the reaction between plants and particular conditions of soil and climate may be fully studied. In the British Empire, in Europe and in the United States of America there are now many important institutions, largely supported by their respective governments, conducting experiments to solve problems relating to the production and cultivation of improved varieties of agricultural plants.

The general trend in breeding is to procure plants of the highest degree of utility. The demands of the market change from time to time, and a plant which may have a high degree of efficiency under one set of conditions may be much less efficient when these conditions change. There is no finality: changes in agricultural practice are continually taking place, and it is therefore widely recognised to be necessary in the interests of agriculture that experimental breeding of crop plants should be conducted on an extensive scale, so that crop production may keep pace with market requirements, and, in addition, enable farming operations to be planned on the best economic basis. Much experimental work is being done to increase efficiency in production by creating plants with greater powers of resistance to disease, of greater productivity, having earlier periods of maturity, better quality of seed, and greater degrees of resistance to cold and to drought.

The improvement of plants is frequently referred to as an art, and many of our farm plants have reached their high standard of excellence simply by the art of selection. But, while there is still scope for the art of the selector, there is an ever-increasing scope for the application of scientific principles on the creative side of the work. To ensure the best progress, methods of breeding must now be based on the widely accepted principles of heredity. Briefly stated, these principles imply that the units determining the different characters of a plant are inherited as definite entities, and that it is possible to obtain many different combinations of these hereditary units or factors. How to effect the combination of the most favourable units is the chief problem of the plant breeder.

It is scarcely necessary to mention that, in carrying out breeding experiments, there is no uniform system that can be followed with every variety of plant. Each crop plant must be considered separately, its mode of reproduction, its floral mechanism, and the composition of the units within varieties being important features that must be taken into account.

Oats and potatoes are important crops in many countries, including Scotland, and to illustrate some of the recent developments in the breeding of these two crop plants reference will be made to experiments that have been made in several different countries. It will be convenient to deal with the work on oats and potatoes separately.

Oats.

'Lodging' of oat crops frequently causes much loss, and in Great Britain, Denmark, Sweden, Canada and U.S.A., &c., experiments are in progress to breed varieties of oats which are highly resistant to 'lodging,' and which also possess other desirable characteristics required for particular conditions in these countries. A defect of many high grain-yielding oat varieties is their liability to lodge or become laid in wet seasons. It is well known that when this happens the costs of harvesting the crop are increased, and if the lodging occurs early in the season the quality of the grain and the straw is usually adversely affected. Various conditions affect the liability of oats to 'lodge'; the amount of rainfall during the season and especially towards the end of the growing period, the rate of seeding, the fertility of the soil, the manures applied, and last but not least, the characters of the variety of oat grown, are all contributing factors that play a part in determining the amount of 'lodging' in an oat crop. The experimental breeder is concerned mainly with the inherent capacities of the plants to resist lodging, and it is his function to produce plants best adapted to the soil conditions where lodging frequently occurs. It is necessary first of all to ascertain those characters which indicate a tendency on the part of an oat plant to become lodged, and when that has been done to see whether the deficiencies can be remedied.

It may help to indicate why certain lines of breeding are being followed if some of the characters of a lodged crop are mentioned. When cereal plants become lodged it will frequently be found that the stems are not broken or bent, but that the plants have lost their upright position through the root systems of the plants being unable to maintain, in an erect position, the stems carrying the heavy heads of grain. An important function of the root system is to provide an anchorage for the plant in the soil. If the anchorage is too weak the fully developed plants cannot stand upright when there is a heavy rainfall. Another character of the plant that affects the tendency to lodge is the length of the straw. The longer it is the greater must be the strain put upon the plant

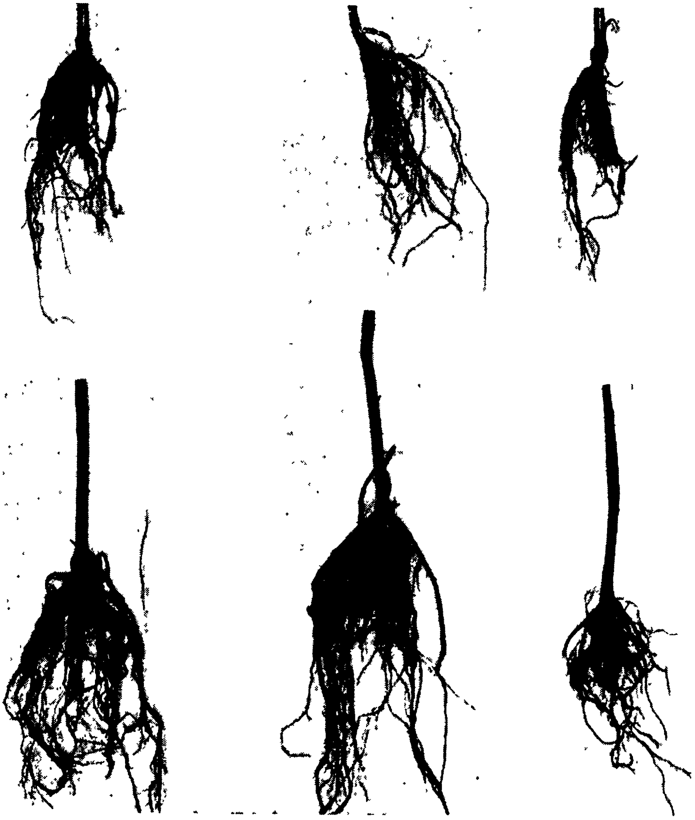


Fig. 45.—*Six different varieties of oats showing differences in root development.*

by wind and rain. A different form of lodging may be observed in a few oat varieties which have hard, brittle straw. When these varieties ripen, the stems tend to break in wet windy weather. Sometimes when this happens the heads or panicles of the plants fall off and grain is lost. At one time it was thought that lodging was largely due to lack of silica in the stems of the plants, but this theory is not now generally accepted.

From the above it follows that increased resistance to lodging should be obtained by breeding plants having roots providing a strong anchorage and having rather short straw which is tough and resilient. It may be urged that if the straw of one variety is relatively short to that of another the yield of grain will be deficient on the short straw one. It is admitted that a small yield will probably be obtained when a short straw variety is grown on soils that lack a sufficient supply of moisture for its requirements, but, on soils where lodging readily occurs there is generally an abundant supply of moisture. In consequence the relatively short-strawed variety, when grown under these conditions, if its anchorage is good, should have the better chance of being resistant to lodging. There is evidence that a relatively short type of straw can be associated with a capacity to develop, under suitable conditions, an abundantly furnished head of well-developed grain.

In attempting to improve the standing capacity of the straw of oats, hybridisation of chosen varieties is usually the method adopted towards that end. Different varieties are crossed, and the unfixed hybrid progenies examined for promising types. In experiments carried out by the writer a variety that has been frequently used as a parent is the well-known and still highly favoured old-established oat known as the Potato. This oat possesses, amongst others, two desirable characters: it is hardy and the grain is of excellent quality. Both of these attributes should be possessed by any new oat if it is to be grown on an extensive scale under Scottish conditions of soil and climate. In certain of the hybrid offspring from crosses with the Potato oat quite distinct differences in length of straw were evident. This was a hopeful feature. When these variants were first observed it was not known whether the differences in length of straw were due to variations in the fertility of the soil or to hereditary causes. In order to test this, some of these relatively short-strawed plants were selected and the produce of each plant sown separately. This process was repeated for several years, and at the end of the period the short straw plants were breeding true for this character, thus showing that this relatively short type of straw is a hereditary character and that it is not merely due to the effects of differences in soil fertility. Later observations proved that these short-strawed plants *resisted lodging better than many of the longer-strawed ones. It is of interest to note that the length of the straw of both* parents was greater than that of those hybrids which were selected as short-strawed types. This phenomenon of two varieties when crossed producing types with shorter straw than either parent illustrates what is known in plant-breeding as 'transgression.' Transgression is not an uncommon occurrence in hybrid progenies, and it is sometimes helpful to breeders. In certain oat crosses transgression towards the other extreme in length of straw—*i.e.*, towards very long straw, has been observed, hybrid plants over six feet in height being noted amongst a progeny in which the majority of the plants were about the same height as the parent varieties—viz., five feet. Although long-strawed plants are not being sought as a means of reducing lodging they might be suitable for the drier soils where the tendency is for the straw to be short. Transgression types have also been found when the character under observation was the period of maturity. In this instance very late maturing plants were noted in the hybrid progeny from two medium-early maturing types.

When a new type of oat resistant to lodging is procured it sometimes happens that it is deficient in some other characters, such as in yield or quality of grain, or it may be too late in reaching maturity. Further experimentation is then necessary to see whether it is possible to combine this increased capacity to resist lodging with that for producing a higher yield of grain or with that of earlier ripening.

When the Scottish Society for Research in Plant-Breeding was instituted in 1921, experiemts were initiated with a view to breeding improved varieties of oats, and these experiments were regarded as an important part of the work of the Station. The creation of new high-yielding varieties resistant to lodging was one of the improvements it was hoped to effect, and definite progress in this direction has been made. The new variety now well known as 'Elder' was raised at the Scottish Plant-Breeding Station, and after it had passed successfully through the Registration Trials conducted by the Department of Agriculture for Scotland it was put into commerce by the Society in 1931. In various trials this oat has given high yields of grain as well as showing that it was the most resistant variety to lodging. Yields of over eleven quarters of grain per acre have been reported, and these show that a capacity to produce a high yield of grain can be associated with that for producing a short type of straw, and that these capacities can be exhibited together provided there is sufficient moisture in the soil.

Another new oat variety raised at Corstorphine has been registered by the Department of Agriculture for Scotland this year. It is named 'Early Miller'; it ripens about ten days earlier than Elder, is highly productive and has a good quality of upstanding straw. The grain is well filled and is of a type favoured by oatmeal millers.

Capacities in plants for producing high grain yield, short straw, or for early maturity are probably complex in their manner of inheritance, and it will likely be difficult to unravel these complexes. But, while the exact mode of inheritance may be unknown, the knowledge that these capacities are influenced by heredity is helpful to the breeder. By systematic crossing of chosen types it may be possible ultimately to obtain varieties of oats with high grain yields, upstanding straw and maturing at suitable periods.

Another problem in oat breeding of interest in Scotland, as well as in several other countries, is that of breeding varieties having a comparatively short growing period and adapted to the less fertile soils in late districts. The varieties of oats known as Potato, Sandy and Tam Finlay are largely grown in the upland districts of Scotland, but it is frequently urged by farmers in these areas that there is need for earlier-ripening varieties which are as hardy as these three and which will at least equal them in quality and in yield of grain. There are on the market at present a choice of varieties which are either very early in ripening or are capable of producing a high yield of grain under suitable conditions, but these when grown under the more adverse conditions which occur in parts of Scotland do not, on the average, give results equivalent to those obtained from the old-established varieties. For the solution of this problem hybridisation of chosen varieties also provides a hopeful means of procuring early-ripening varieties of oats adapted to the districts above mentioned. At Corstorphine some of the old Scottish varieties, such as Sandy, have been crossed with some very early-ripening ones, and early-ripening types have been secured. Many of these, however, have straw that is too liable to lodge. Further breeding by back-crossing is necessary to see whether some shorter and better strawed early-ripening types can be evolved.

Considerable success has already attended the efforts at the Scottish Plant-Breeding Station to breed an oat suited to the conditions prevailing in some of the later districts of Scotland. One variety derived from crossing Sandy with Leader has given encouraging results in districts as far apart as Orkney, Argyll and Selkirkshire. This variety is known as 'Bell,' and it was registered as a new variety by the Department of Agriculture for Scotland in 1932. Incidentally, it may be mentioned here that the Scottish Society for Research in Plant-Breeding has not put their new selections of oats into commerce until they have successfully passed through various trials, including the official trials of the Department of Agriculture for Scotland.

The oat plant, as is well known, may be affected by several fungous diseases. The older varieties, such as Potato and Sandy, are more liable than are most of the more modern ones to be attacked by smut. This disease is characterised by a mass of sooty-like material consisting of spores, taking the place of the oat kernel at the time it should be developing in the ear or panicle. Before the plants are ripe the spores are shed. Crown rust, another fungous disease, also affects oats, but neither of these diseases generally causes much serious damage in Scotland. In warmer countries, for example in Canada, the United States of America and Australia, rust may seriously affect the yield, and in these countries work is in progress to breed rust-resistant varieties. Certain varieties of oats derived from the species *Avena sterilis*, or animated oat, seem to be highly resistant to rust. *A. sterilis*, apart from its capacity to resist rust, is not of much economic importance. It can, however, be crossed quite readily with the cultivated oat *A. sativa*, and types having some of the characters of the cultivated oat combined with the rust-resistant characters of *A. sterilis* have been produced. Most of these derivative

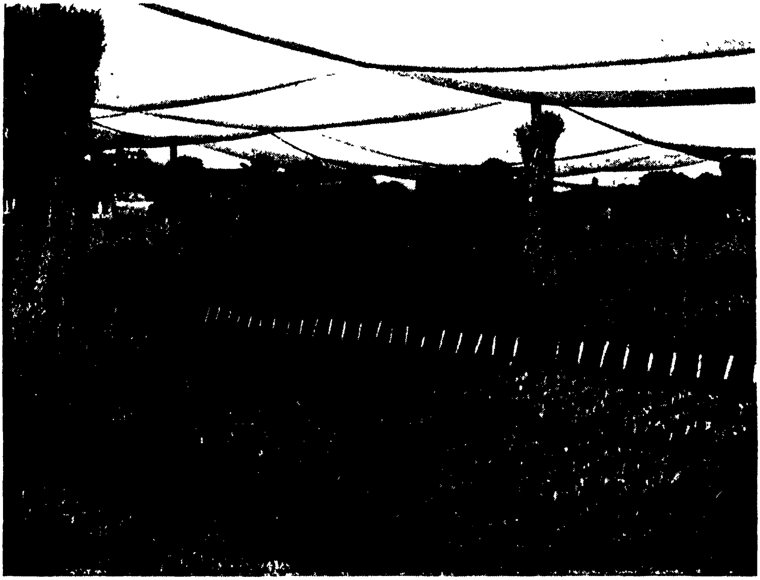


Fig. 46.—*A collection of short-strawed plants in the oat-breeding cage at Scottish Plant-Breeding Station, 1932, ready for harvesting.*

types have reddish grain. They are largely grown in Australia and America where attacks of rust are prevalent.

A disease seriously affecting oats, especially in certain areas in the West of Scotland, is that known as Leaf Stripe, caused by a fungus *Helminthosporium avenæ*. This disease has been studied extensively, and as is now well known it can be very effectively controlled by dressing the seed prior to sowing with certain proprietary compounds.

There is another disease which appears on oats during dry summer weather. It occurs more frequently on some varieties than on others and when the attack is severe reduction in grain yield follows. This disease, known as 'dry fleck,' or 'grey spot,' does not seem to be due primarily, at least, to attack by a fungus, but to arise as a result of the condition of the soil. Deficiency of water, an unsuitable calcium-potassium balance and an abundant supply of nitrogen seem to favour its occurrence. Affected plants at first show elongated brownish-green flecks on the leaves. Later, these flecks fuse, and, if dry weather persists, the leaves wither and die. The plants may survive, but the yield is reduced. Manuring with manganese sulphate has been found to be effective in controlling this disease. Some varieties show a high degree of resistance to this trouble, while others are more susceptible. Resistance and susceptibility are hereditary characters, and it should therefore be possible to breed the desired oat types which are resistant. Experiments are in progress to combine the capacity for resistance with other desirable characters.

Occasionally, varieties of oats contain a greater or less number of aberrant forms or 'off types.' Frequently these are present as a result of one variety being accidentally mixed at some stage with another. If the threshing machine or the seed drill is not thoroughly cleaned out when a change over from one variety to another is made, then admixture readily occurs. Probably a further source of admixture is when seed grain is put into sacks which have contained grain of another variety and which have not been thoroughly cleaned before being filled again. Variation in type may also occur as a result of natural inter-crossing, but most investigators have found that only a very limited amount of inter-crossing takes place in oats.

Crops of oats are often infested with wild oats, *A. fatua*. This oat occurs as a weed on arable ground and it is very difficult to eradicate. There is, however, another type of oat grain which resembles the wild oat and which occurs in many varieties though not very extensively. It arises directly from the cultivated variety in which it is found. It is known as a 'fatuoid' or false wild oat, and its chief difference from the wild oat is that its seeds do not show delayed germination as happens in the case of the wild oat. It will germinate immediately after it is ripe just in the same way as grains of cultivated varieties. Many cultivated varieties are believed to produce these fatuoid types, and the fatuoid plants closely resemble those of the parent variety, the chief diffeences being found in the grain. Each fatuoid grain bears a strong bent awn and a horseshoe-shaped mark at the base of the grain. Little definite information regarding the origin of these types was available until recent years. Several biologists, through studying particular constituents (the chromosomes) of certain cells of the plants, have come to the conclusion that these aberrant or fatuoid types arise as a result of a change having taken place in the Chromosome mechanism at one of the critical stages in the life of the parent plants. It seems to be established that fatuoids do not originate through the inter-crossing

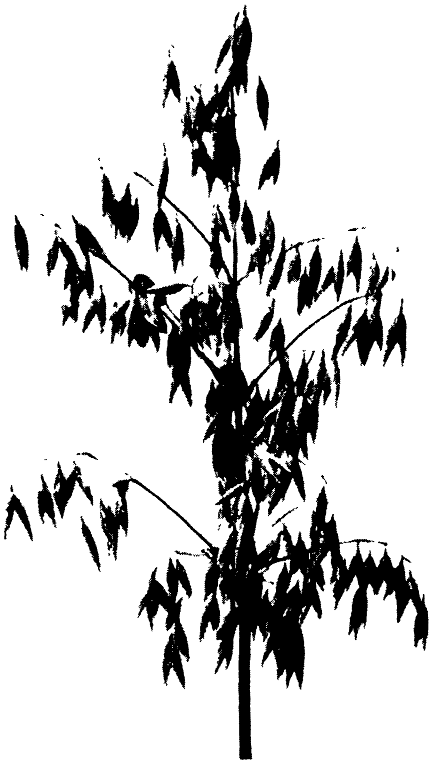


Fig. 47.—*A well-furnished oat panicle on a short-strawed plant.*

of the cultivated and the wild oat. A point of practical importance has been raised by Huskins of Montreal in view of the origin of these fatuoid types. He points out that since changes may take place in the chromosome mechanism, it may be much more difficult than was generally believed to maintain 'pure lines' of oat varieties, even when adequate precautions are taken to avoid admixture and inter-crossing of varieties.

There are now in commerce in North America, though not to any extent in this country, a few varieties of oats in which the kernels are not firmly enclosed by the husks. In these the husks are membranous, that is, they are of similar texture to the glumes or chaff. When these membranous or soft-husked varieties are threshed the kernels of the grain come from the machine without the covering husk; the grains are naked like wheat grains. These naked-grained varieties have been derived originally from crosses between cultivated oats with firm husks and the naked Chinese oat. This latter oat quite often has six grains, sometimes more, in each spikelet, instead of the usual one or two grains found in the Potato and other oat varieties. Frequent attempts have been made, through crossing the cultivated oat with the Chinese oat, to obtain an ordinary type of oat having more than four grains per spikelet, and, incidentally, giving an increased yield of grain. This increased number of hard-husked grains has not been obtained, however, as it has been repeatedly found that when there are more than four grains per spikelet the grains are of the naked type or consist of varying proportions of both kinds.

While naked-grained oats have not yet been grown on an extensive scale, experiments are in progress to see whether there might be a place for them in the feeding of pigs and poultry. In Canada a huskless variety, known as Laurel, has been giving encouraging results in various trials, and it is now being tested there on a large scale.

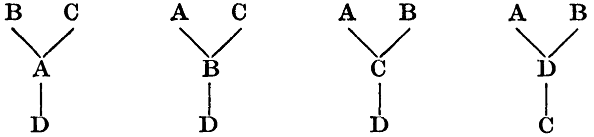
There has recently been developed a process for treating seeds of cereals and other plants that may have far-reaching results. While this type of experimentation may not come directly under the category of plant-breeding, it is of sufficient practical importance to warrant making brief reference to it here. This new method of treating seed has been evolved by Professor T. D. Lissenko of Odessa Plant-Breeding Station, and it has the effect of enabling certain crop plants to reach maturity at a considerably earlier period than they would in ordinary circumstances. A description of the process has been given by Dr R. O. Whyte and Dr P. S. Hudson in one of the publications of the Imperial Bureaux of Plant Genetics. Therein the process is termed 'Vernalisation.' In an American publication the process is termed 'Iarovisation.' In treating seeds according to the Lissenko method the process varies according to the species of seed, but in its essentials the germination process is just started by wetting the seeds and then keeping them in the dark at a certain temperature for a specified period. After treatment the seed is sown in the usual way at the ordinary time, or later if this should be necessary. In treating winter wheat by this process, for example, one writer states that the seed is moistened with water until it contains about 50 per cent of moisture and that the germination process is then allowed to proceed for about twenty-four hours at a temperature of between 50° F. and 60° F., and thereafter the seed is kept in darkness at a temperature of between 32° F. and 34° F. for a period varying from forty to fifty-five days, frequent stirring of the seed being necessary during this stage. At the end of this process the treated or vernalised seed is ready for sowing. If the seed is not to be sown for some time it may be dried. It has been claimed that by sowing 'vernalised' winter wheat in the spring normal yields of high-quality grain were secured from the resulting crop.

Potatoes.

Two fundamentally different processes are represented when, in ordinary practice, an oat variety and a potato variety are propagated or multiplied. The oat is multiplied through the seed, which, botanically speaking, is true seed, whereas the potato is multiplied not through the true seed but through the tubers. A tuber is simply an underground shoot charged with a large amount of nutriment, and it is a specially developed part by which the potato propagates itself. When grown as an agricultural crop, potatoes are multiplied vegetatively much in the same way as many other perennial plants are propagated by cuttings. When a plant is multiplied vegetatively, as by tubers, the resulting plants, for all practical purposes, generally possess the same characters. There are occasional instances in which distinct differences, known as bud variations, appear, but these are, so far as the potato is concerned, of infrequent occurrence and not always of practical importance. This does not mean that little hereditary variation occurs in potatoes. The potato, as is well known, forms flowers and produces true seeds, contained within a berry or 'Potato apple' as it is sometimes called. All potato varieties, however, do not have the same capacity to produce berries. Some are practically sterile, while others may set seed fairly freely if weather is favourable. When seeds from a potato berry are sown, the resulting plants generally comprise a varied assortment, varying proportions of which may be decidedly inferior as economic types. Most if not all cultivated potato varieties are very impure in their hereditary characters, and in this respect they are different from oats.

At the present time experimental breeding with potatoes is largely concerned with problems relating to period of maturity, to yield, type and quality of tubers and to resistance of the plants to several diseases. Various lines of breeding are being followed with a view to obtaining more precise information regarding the hereditary characters of potatoes.

After repeated generations of crossing and recrossing of varieties, as has happened in potatoes, it is doubtful whether much progress can be expected in breeding simply by continued crossing. One method of breeding that is being tried by certain investigators is that known as diallel crossing. To illustrate let us assume that there are four fertile varieties, A, B, C and D, to be used in breeding experiments. Each one of the four would be crossed with the other three as illustrated diagrammatically thus:—



The plant indicated in the centre of each group of four letters represents the female parent, and it will be observed that each cross is made both ways—*i.e.*, ‘ A ’ is crossed with ‘ B ’ and ‘ B ’ is crossed with ‘ A,’ ‘ B ’ is crossed with ‘ C ’ and ‘ C ’ is crossed with ‘ B ’ and so on until all the possible combinations are effected. This system aims at finding out which pair of varieties gives plants approaching nearest the types desired, and it provides a method of ascertaining what might be called the parental value of any pair of plants that can be successfully crossed. In view of the complex hereditary constitution of many potatoes it has a measure of value for experimental breeding. In its scope, however, this method is limited by the fact that many varieties of potato cannot be used as parents on account of sterility or because of the flowers dropping prematurely. Further, it does not provide the best analysis of the hereditary characters possessed by a variety.

A problem confronting potato-breeders is to obtain a wider choice of parental types, and, if possible, a range of varieties whose hereditary capacities for transmitting desirable characters are known. A theoretically hopeful line of investigation that is being followed in this connection is to inbreed or self-fertilise a representative collection of plants for a number of generations. This process should automatically eliminate the sterile types and provide plants in which all the organs of reproduction function freely. Throughout this process of repeated self-fertilisation the breeder incidentally eliminates as many as possible of the undesirable characters revealed by the process of inbreeding, and this in itself represents some progress. Repeated self-fertilisation or inbreeding will probably result in the loss of a certain amount of vigour, but it should also be effective in securing self-fertile plants which breed true to type for some if not all of the important agronomic characters. It is not to be expected that these inbred plants will themselves be of outstanding value for cultivation, but the chances are that by intercrossing these inbred and relatively pure-breeding plants, as is done in the diallel method of crossing already referred to, still greater progress will be possible. The success that has attended the modern method of breeding maize in North America gives a promising lead to this new method of breeding potatoes.

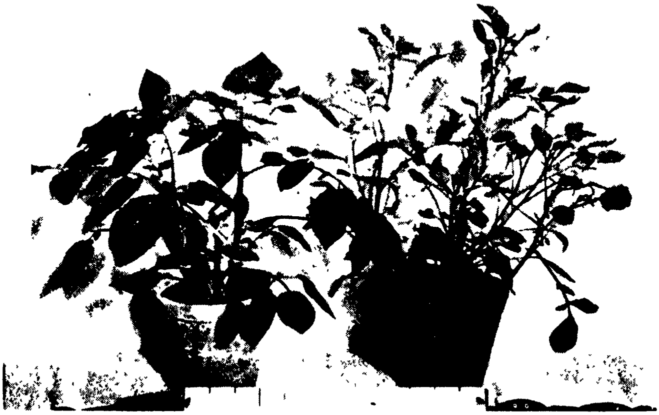


Fig. 48.—*A healthy seedling (left) and a degenerate seedling (right) from one family (selfed four generations).*

The procedure that has been followed in maize-breeding may be briefly described by way of illustration. In the initial stages maize plants were self-fertilised and protected from accidental cross-pollination. The resulting seed was saved, and the process of self-fertilisation and selection was repeated for several generations, until the plants appeared to be breeding true for the desired sets of characters. In the early stages of this process many diverse types appeared, depending, of course, on the hereditary components of the initial plants. As a result of repeated self-fertilisation there were obtained many different types, the progenies of which all bred true. These uniform types were then systematically used in pairs for crossing amongst themselves. The value of any pair of inbred varieties as parents could not be ascertained beforehand; their parental values were determined from the progeny which they produced. In other words, the progeny test was the important criterion. It has been found repeatedly that, when certain of these inbred plants were crossed, the hybrid progenies were not only much more vigorous than either parent, but that they were also more vigorous and more productive than the ordinary open-pollinated cultivated varieties. In fact, it has been claimed that through this system of inbreeding, followed by the crossing of proved inbred lines, seed production has been increased by 15 to 20 per cent. This increased productivity is believed to result from favourable combinations of hereditary growth-promoting factors being obtained. To maintain the highest degree of production on a large scale, from the crosses of inbred strains, a special technique has now been devised, and the full effects of hybrid vigour are being utilised in agricultural practice. The special technique is necessary because the maize plant is raised each season from seed and also because cross-pollination readily occurs.

Returning to the subject of potato-breeding, we recall that the potato is in practice multiplied vegetatively, not from true seed, and that although it may be a complex hybrid it shows little variation. The potato is therefore excellent material for retaining the advantages of that increase in vigour usually associated with hybrids, especially that which frequently accompanies the first cross. In view of the success that has attended the inbreeding of maize, it seems appropriate that experimentation on inbreeding of potatoes, followed by subsequent intercrossing, is being undertaken.

In Scotland, as in many other countries, potatoes are frequently found to be affected with virus diseases, commonly known as Leaf-roll and Mosaic. When infection with any of these diseases is severe and widespread throughout a crop, then a large reduction in yield follows. While the virus diseases of potatoes have been known for many years, there seems reason to believe that these diseases of potatoes have become more prevalent within comparatively recent times. Doubtless more attention has been paid to them during the last few years, and this has given them an increased measure of prominence. Certain weather conditions appear to promote the spread of virus diseases. The comparatively dry summer of 1932 in Scotland seems to have favoured their spread in potatoes, and as a result these diseases were more common in potato crops in 1933 than is usually the case amongst crops raised from apparently healthy plants.

To combat the effects of virus diseases a complex problem is presented for solution. The causal agent or agents of the disease have not yet been isolated from their hosts, but much work is in progress in many countries with a view to obtaining a clearer insight into the nature of virus diseases, which affect not only potatoes but many other plants as well. As regards the spreading of virus diseases among potatoes, it has been found by different workers that at least one species of the small green-fly or aphis known as ***Myzus persicæ*** plays an important part in the transmission of certain virus diseases from plant to plant. It appears that where this insect is numerous infection spreads readily, but when it is scarce or absent infection spreads less rapidly. Certain areas in the North of Scotland, for example, have gained a reputation for producing seed potatoes of a high standard of freedom from virus diseases, and there is reason to believe that one of the factors contributing to this condition is the relative scarcity of the disease-spreading agent, or vector as it is termed, the green-fly. But even in these districts if a crop of potatoes is to be kept in the highest degree of health it is advisable that unhealthy tubers should not be planted, and if any unhealthy plants appear in a growing crop they should be eliminated as soon as possible, since certain other species of aphis may also transmit virus disease. In special areas of Scotland it is practicable to maintain stocks of potatoes in a very healthy condition and various farmers are now doing this.

Some varieties appear to succumb to the effect of virus diseases more readily than do others. The breeder is therefore interested to ascertain whether it may be possible to breed varieties of agricultural utility which will not readily succumb to the effects of virus disease. Workers on virus diseases of potatoes have found that certain varieties may, without showing any signs of disease, carry an agent which, when transmitted to another variety, produces serious virus-disease symptoms. A plant which harbours a disease-causing agent, but which shows no signs of disease itself, is known as a 'carrier.' Whether the breeding of carriers and the cultivation of this type of potato only would obviate loss through virus disease infection is problematical. One possible source of trouble with 'carriers' is that different varieties of potato may not all react alike. One might be a carrier of the agent causing one form of virus disease, and another a carrier of an agent causing another form of virus disease, and yet either might be seriously affected by the agent carried by the other. If it should be possible to breed varieties which will resist the entrance or the multiplication within the plant of the agents causing virus diseases, then the breeding of resistant types might be a satisfactory solution of the virus-disease problem in potatoes. Resistant types would not at least act as a source of infection for other varieties. The breeding of virus disease-resistant potatoes, however, is a problem that still awaits solution.

The agents causing virus diseases in potatoes do not seem to be transmitted through the true seed, and this is helpful to the breeder. When seeds are collected from a plant which is badly infected with virus disease, however, the progeny frequently contains a larger proportion of weakly degenerate plants than does the progeny of seeds obtained from a healthy plant. These weakly seedlings appear to the eye as if they were affected with leaf-roll. There is now reason to believe that these degenerate-like seedlings are not affected with virus disease, but that they arise as a result of some complex change having taken place in their hereditary mechanism. Whether the presence of virus disease in the female parent plant sets up a reaction which affects the character of the seed is not known, but it seems preferable in breeding potatoes to breed only from healthy plants when that course is possible.

The potato-grower sometimes experiences much waste amongst his potatoes through the occurrence of the disease known as blight. Its incidence varies with the season: some years it may be very prevalent and cause much damage while in others it may be practically non-existent. This disease, as is well known, is caused by the presence in the plant of a fungus, *Phytophthora infestans*. It appears that two strains of this fungus have been discovered, and that some potato varieties may be resistant to one strain of the fungus and yet be affected by the other. It may be mentioned, incidentally, that workers on stem rust disease of wheat have found different biologic strains of the rust fungus which produce the disease, and that some varieties of wheat are resistant to certain strains of rust and susceptible to others. As regards the commonly cultivated varieties of the potato, apparently all of them may be more or less seriously affected by blight, and various breeders in America and Europe have therefore been conducting extensive investigations to discover whether improved varieties resistant to blight can be evolved. Breeding from cultivated potato varieties only has given but little hope of success, and an extensive search has been made for wild potatoes in South America and Mexico for the purpose of obtaining for experiment new varieties or species that are resistant to blight. Many varieties and species from South America have been obtained, but according to recent work done in the United States of America there seems little hope of introducing blight resistance into cultivated varieties by crossing with South American species. Two Mexican species which are resistant to blight have been found, and they have been crossed with some of the cultivated varieties with the object of introducing blight resistance into cultivated types. These wild species, however, have many characters that are undesirable from a potato-grower's point of view; the plants have very fibrous roots, the stolons are long and the tubers are small, to mention a few of the inferior properties. It will doubtless take many generations of systematic breeding and selection to evolve a new variety from these wild species resistant to blight and also possessing the other characters desired in a cultivated variety at the present time. Many seedlings will have to be raised and tested for blight resistance, and the most promising of the resistant ones back-crossed to the cultivated variety. This testing, selecting and back-crossing will probably have to be repeated many times before a productive and good culinary quality, blight-resistant potato is evolved. There is reason to hope, however, that in time the desired object will be achieved.

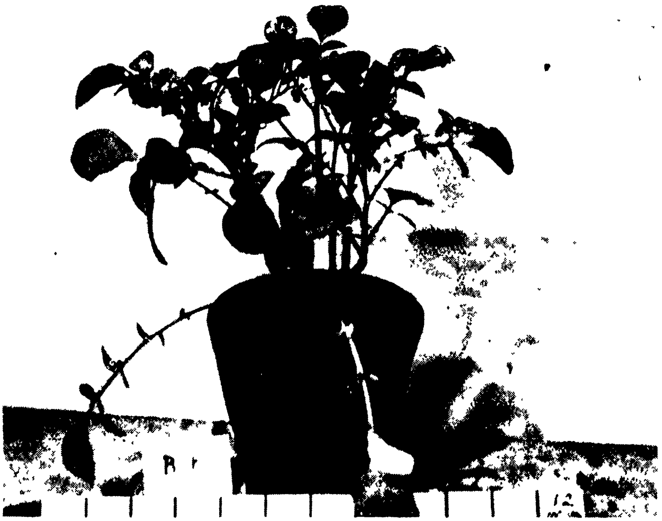


Fig. 49.—Solanum demissum. *A Mexican species used in breeding for resistance to blight.*

It may be of interest to readers to refer to another and rather novel method that has been tried to produce potatoes resistant to blight. In the genus Solanum, to which the potato belongs, chimæras occur, and they can be created experimentally. A plant chimæra may be regarded as representing the mechanical coalescence of two parent forms, or of different parts of two parent forms, to produce a living unit: it is sometimes known as a graft hybrid, and in a way it is a monstrosity. One ot the earliest known plant chimæras or graft hybrids is Adam's Laburnum. Solanum chimæras are known in which the 'skin' or epidermis of a plant of one species occupies the place of the corresponding tissue in a plant of another species, thus giving the coalescence of parts of two parent forms. The tomato is a solanum, and as it is not attacked by the same form of *Phytophthora infestans* which attacks potatoes, the idea occurred to a Danish worker that it might be possible to replace the potato epidermis by a tomato epidermis and thus obtain resistance to potato blight. So far as the writer is aware, however, success has not yet attended these efforts, but perhaps improved technique may yet yield interesting results. It is doubtless a line that should be further explored.

Chromosomes and Experimental Breeding.

In connection with the study of heredity, many investigations have been made to discover a physical basis for the transmission of hereditary characters. In this respect the study of the constituents of plant cells has been exceedingly fruitful. The constituents that have been most minutely examined are very small bodies known as chromosomes. The numbers of these and their manner of dividing and multiplying have been carefully observed on an extensive scale by many workers, and a great mass of evidence has been obtained from which it is concluded that these bodies, known as chromosomes, are the carriers of the hereditary units or factors. A noteworthy feature in connection with the chromosomes is that, in general, their number is constant in each living cell of the plants of any one variety, though the numbers frequently vary in different species. For example, the commonly cultivated varieties of oats have twenty-one chromosomes in the germ cells, while the bristle-pointed oat *A. strigosa* has only seven in its germ cells Most of the cultivated potatoes have twenty-four chromosomes in the germ cells. It should be noted that the germ cells usually contain half the number of chromosomes found in the body cells of the plant. For instance, in the body or somatic cells of the commonly cultivated oats there are forty-two chromosomes. Frequently related species cannot be crossed when there are wide differences in their chromosome numbers. For example, the bristle-pointed oat *A. strigosa* has never been successfully crossed, so far as the writer is aware, with any cultivated oat of the 42-chromosome group. By obtaining knowledge of a plant's chromosome numbers and mechanism, guidance can frequently be obtained as to further procedure to be followed in breeding. Certain plants have probably originated through the duplication of chromosome sets, since in various closely related species the number of chromosomes occur in multiples of the number in the lowest member of the species. In oats there is a species with seven chromosomes, one with fourteen, and another—comprising many of the cultivated varieties—with twenty-one, these being the numbers present in the germ cells of the respective species. Frequently the plants of related species having a multiple number of chromosomes are larger and more vigorous than those with the lowest chromosome number. In certain instances increase of chromosome sets or groups has been obtained experimentally. It would therefore seem that if further duplication of chromosome sets could be produced, new species of plants would be procured, and it is probable that amongst these there would be some with an enhanced agricultural value. The possibilities of inducing chromosome duplication, therefore, present an attractive field for the experimental breeder.

Field Testing of New Productions.

When the plant-breeder has evolved a new variety of oat, potato or other plant he is confronted by the problem of comparing it with the standard commercial varieties, in order to obtain some relative measure of its degree of utility. In the early stages of the development of a new variety, comparisons are largely empirical, but when it reaches the field-trial stage more accurate comparisons can be made by the employment of modern methods of plot-trial technique. In Scotland, as in other countries, assistance in comparing new varieties can now be obtained by having them included in the official Government and the Agricultural College trials. These trials serve a most useful purpose in helping to fix the relative degree of utility of any new variety. They also help to prevent a variety, similar in all its essential characters to one already known, from being put into commerce under a new name. It is perhaps worthy of note in this connection that in certain countries a new variety cannot be put into commerce until it has undergone a series of official trials and has been found to be new and of distinct merit. In systematically conducting field trials it is now the generally recognised practice that these should be laid out in such a way as to permit of a statistical analysis of the results being made. Within recent years methods of conducting field trials have been greatly improved and more reliable conclusions can now be drawn.

In conclusion, it may be said that the chief aim of plant-breeders is, in general, to breed plants adapted to fairly well-defined conditions of soil and climate. The breeding of highly productive varieties of oats and potatoes, resistant to disease, occupies an important place in many plant-breeding programmes. The success that has attended the efforts in breeding wheat and various other plants resistant to certain diseases suggests that further progress will also be made in breeding highly productive, disease-resistant oats and potatoes. In many countries there is an increasing tendency for work devoted to the improvement of plants to be undertaken by plant-breeding organisations. These, in many cases, receive financial support from state funds. There are various reasons for this tendency, but it will suffice to mention that for the best progressive and conclusive results, plant-breeding work requires to be conducted on an extensive scale, and may spread over many years before it is completed.

SOME SHEEP FEEDING EXPERIMENTS.

By PRINCIPAL W. G. R. PATERSON, The West of Scotland Agricultural College.

SHEEP FARMING has for many years been a distinctive feature of British agriculture, and this class of stock has long made a notable contribution to two of the prime necessaries of life —namely, food and clothing.

One feature worthy of note in connection with sheep farming in this country, relative to that of most other countries, is the intensive stocking that prevails. In that respect the Motherland is surpassed only by New Zealand.

Another feature of special importance, and one probably unequalled in any other country, is the multiplicity of pure breeds and of crosses, the latter being particularly numerous and valuable.

Considered relative to cattle population, sheep figure even more prominently in Scotland than they do in England and Wales, the number of sheep carried per hundred head of cattle, according to the 1933 census, being as follows :—

	Cattle.	Sheep.
Scotland	100	642
England and Wales . . .	100	273

No matter what system of farming is pursued, or the extent of the farming operations, a place can generally be found for sheep, and in that respect they may be said to be somewhat akin to poultry, which can be introduced and kept with advantage under a great diversity of conditions.

In the case of our hill farms, sheep may, and very often do, constitute the entire stock, but we find them also in a major or minor capacity on mixed cropping and grazing farms, on dairy farms, on purely arable farms and even on smallholdings and crofts. They can as a rule be introduced in some capacity unless perhaps where the farming is very intensive or carried on on a very small scale. Breeding ewes may be kept for the production of lambs for the fat or store market, or mutton production may be the line followed, sheep being fattened on grass, on green forage crops, or on roots. In the case of the root crop in particular, the sheep often serve the double purpose of enriching and compacting the land and providing a market for the crop in the form of mutton. Ewe *hoggs from hill grazings may be taken by low-ground farmers* for wintering on grass, or pedigree flocks of one or other of the noted breeds may be maintained for the production of rams for pure breeding or for crossing. These examples by no means exhaust the possibilities from sheep, but may suffice to indicate at least some of the aspects in which they can figure.

Though sheep occupy such an important place in Scottish agriculture, when we consider the amount of investigational work undertaken with other classes of stock, it would appear that sheep have not always received the attention they merit. In support of this statement, one has only to refer to the Highland and Agricultural Society's 'Transactions,' as these have not included a paper dealing directly with sheep feeding for mutton production since 1910, when a very comprehensive review was given by Ingle.

It must, however, not be concluded that little has been done in the interval, for that would be entirely wrong. At a great many different centres much valuable work has been carried on, and fuller information relative to sheep feeding is gradually accumulating.

Possibly one reason why the amount of investigational work with sheep has not been quite in keeping with that undertaken with some other classes of stock may lie in the fact that, with sheep, the difficulties to be overcome in order that absolutely reliable results may be obtained are generally greater. In the case of feeding for mutton production, it is, for example, impossible to differentiate between actual increase in body weight and in wool. Further, with sheep in the open, even if it is possible to keep them fairly clean, the amount of moisture associated with the fleece and the actual weight of the fleece varies with the state of the weather, and live weights recorded may prove rather misleading.

There is the further fact that, unless the ground is very bare, the sheep will generally pick up something from it to supplement their rations, and for accurate results conditions must be as uniform as possible in that respect. Not only so, but some sheep undoubtedly take rather more than their due share of food and some considerably less.

On the other hand, in sheep feeding trials one can generally employ fairly large numbers, and that is a great advantage, as it overcomes to some extent at least variations due to differences in individuality.

As the area served by the West of Scotland Agricultural College includes many districts where sheep play a very important part, advantage has been taken of the facilities now afforded at Auchincruive, and several feeding trials have been carried out with a view to gleaning information likely to be helpful, not only to those in the College area but to sheep feeders in general.

It has to be admitted that the rations that are employed in sheep feeding are, in the great majority of cases, rather the result of experience than of a knowledge of the actual requirements of the sheep in the way of food for body maintenance and for production in the form of live-weight increase. In the case of this class of stock scientific rationing has not quite come into its own.

Feeding Trials, 1932-1933.

Preliminary trials carried out by the College at Auchincruive during the winter of 1932-33, and briefly reported on in the 'Scottish Journal of Agriculture,' Vol. XIV., No. 2, April 1933, had indicated that where the rations consisted of swedes and concentrates, and rapid fattening was the aim in view, material benefit was likely to accrue from restricting the allowance of swedes and giving a fairly liberal amount of concentrates.

This trial, which was carried out with 112 cross hoggets (Border Leicester ram and Blackface ewe) in four groups with 28 sheep in each group, showed that in the case of sheep, fattened for a period of nine weeks, and finishing between 90 and 100 lb. live weight, an average daily ration of 16 lb. swedes and 1 lb. concentrates fed to Group 1, while quite good, was not so effective as one consisting of 12 lb. swedes and 1½ lb. concentrates and which was fed to a second group of sheep; nor was this in turn as economic as a ration of 8 lb. swedes and 1⅞ lb. of concentrates, which, when fed to a third group, gave practically the same live-weight increase as that from Group 2, but a distinctly higher carcass weight.

The original intention in the case of the third group was to give a concentrate ration which, by starting at 1¾ lb. and increasing to 2¼ lb., would average 2 lb. daily over the nine-week feeding period. A concentrate allowance of 2¼ lb., however, proved rather more than the sheep could consume, and the average daily consumpt per animal worked out at 1⅞ lb. of concentrates.

A fourth ration, consisting of 16 lb. swedes and no concentrates, but with hay *ad lib.*, while relatively cheap, did not prove so satisfactory in view of the much lower rate of progress resulting from its use. The concentrate mixture fed to the three groups of sheep consisted of—

2 parts Crushed Oats.
1 part Bran.
1 part Decorticated Cotton Seed Meal.

The daily allowance, which for the three groups receiving concentrates, started respectively at ¾ lb., 1¼ lb. and 1¾ lb., was increased by one ounce per sheep per week, giving over the nine-week feeding period the average amounts already indicated—namely, 1 lb., 1½ lb. and 1⅞ lb.

The live weights of the hoggets in the different groups at the beginning and end of the experiment, and the average increases per sheep for the nine-week period and per day, were as follows :—

Group.	Average Daily Ration.	Number of Sheep.	Average Live Weight.		Average Live-Weight Increase.	
			Start.	Finish.	For Period.	Per Day.
			lb.	lb.	lb.	lb.
1	16 lb. Swedes 1 lb. Concs.	28	79¾	92¾	13	·20
2	12 lb. Swedes 1½ lb. Concs.	28	79¾	95¾	16	·25
3	8 lb. Swedes 1⅞ lb. Concs.	28	79¾	96	16¼	·25
4	16 lb. Swedes No Concs. Hay *ad lib.*	28	79¾	90¾	11	·17

Feeding Trials, 1933-1934.

During the winter of 1933-34 feeding trials were again undertaken, the main objects in view being the following :—

1. To obtain information as to the relative merits for mutton production of certain feeding-stuffs very similar in feeding value as assessed on the starch equivalent basis, but showing considerable variation in protein content. The feeding-stuffs tested were Palm Kernel Meal, Decorticated Cotton Seed Meal and Decorticated Ground Nut Meal.
2. To get some indication as to the relative values in mutton production of swedes, silage and sugar beet, and information as to the amount of beet pulp that might be safely introduced into the ration.
3. To ascertain the result from housing and feeding sheep indoors.

Apart from comparing rations containing different feeding-stuffs, and noting the result from housing and feeding sheep indoors, further information was desired as to the actual amount of food required by sheep of known weights, as there would appear to be considerable difference of opinion on that point.

I. Palm Kernel, Cotton Seed and Ground Nut Meals.

For the experiment with these meals nine score of cross hoggets were purchased in the end of September and the beginning of October 1933, the average in-buying price being 22s. 6d. per head. These hoggets were Border Leicester Blackface crosses and similar to those employed in the previous trials already briefly referred to. After purchase they were run on old grass land for a period of approximately six weeks, and subsequently from the nine score that were available, 144 were selected. These were arranged in four groups with 36 in each, the groups being made as uniform as possible in all respects.

Before the sheep were arranged in groups they were weighed individually on a very accurate self-recording weighbridge and were numbered by tattooing a serial number in both ears, a method which incidentally was found to provide a very simple and reliable means of ascertaining the individual progress of each hogget.

As an additional precaution, after the groups were formed the sheep comprising each group were prominently marked with red keel or blue paint on the neck, shoulder or rump, so that there might never be any difficulty in assigning them to their respective groups.

The groups of hoggets were not actually put on the turnip land, but were enclosed in areas extending to approximately two acres each on a section of the field adjoining the turnip land, and on which a silage crop had been grown.

At the time the sheep were put on there was a fair amount of aftermath from the silage crop, the four sections being alike in that respect. This, instead of being a drawback, proved particularly useful, as it gave the sheep something to pick at for the first few days, and by the time it was entirely cleared up, the great majority of them were eating fairly freely from the troughs.

The Rations Fed.

In view of the results obtained in the previous trial the swede ration was restricted in amount, the commencing allowance for all of the sheep being 10 lb. daily. After a period of three weeks this daily allowance was increased by 1 lb. to 11 lb., and three weeks later the amount was raised to 12 lb., and continued at that until the end of the ninth week, when the trial terminated. This progressive increase in the allowance of swedes kept pace to some extent with increasing food requirements arising from the increase in the live weight of the sheep.

The swedes were cut into fingers by the ordinary turnip cutter and fed in troughs in the usual manner, the daily allowance for the different groups being carefully weighed.

Fig. 50.—*Group I.* (*Palm Kernel Meal*).

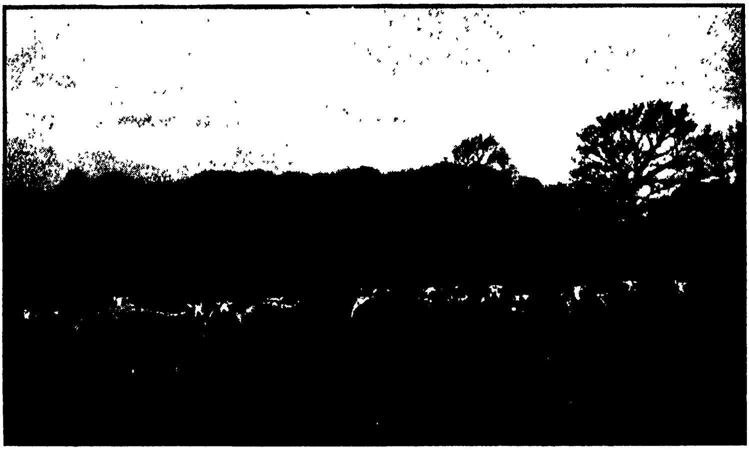


Fig. 51.—*Group IV.* (*Decorticated Cotton Seed Meal and no Hay*).

The concentrate mixtures fed to the four groups of sheep were identical up to a point, and consisted of—

1 part of Crushed Oats,
1 part of Kibbled Maize,
½ part of Dried Grains,

with, in addition, 1½ parts Palm Kernel Meal or Decorticated Cotton Seed Meal or Decorticated Ground Nut Meal.

The daily allowance of the mixture of concentrates at the commencement of the trial was 1 lb. This was increased at the rate of 1 oz. per sheep per week, and rose to 1½ lb. in the ninth week, after which the experiment finished. The average daily consumpt per hogget was therefore 1¼ lb., or 78¾ lb. in all for the full feeding period.

In addition to the allowance of swedes and concentrates, three of the groups were given a daily allowance of ¼ lb. of good Ryegrass and Clover Hay, and this was fed as long hay in an ordinary hay rack. The fourth group of sheep were given no hay.

The full scheme of rationing was as follows :—

GROUP 1.—Swedes 10 lb. at start, increased by 1 lb. after each three-week period to a maximum of 12 lb. Mixed concentrates, including Palm Kernel Meal, 1 lb., increased by 1 oz. weekly to a maximum of 1½ lb. Hay, ¼ lb.

GROUP 2.—Swedes, concentrates and hay as for Group 1, excepting that Palm Kernel Meal was replaced with Decorticated Cotton Seed Meal.

GROUP 3.—Swedes, concentrates and hay as for Group 1, excepting that Palm Kernel Meal was replaced with Decorticated Ground Nut Meal.

GROUP 4.—Swedes and concentrates as for Group 2, but without hay.

COMPOSITION OF THE PALM KERNEL MEAL, DECORTICATED COTTON SEED MEAL AND DECORTICATED GROUND NUT MEAL USED IN THE EXPERIMENT.

	Palm Kernel Meal.	Decorticated Cotton Seed Meal.	Decorticated Ground Nut Meal.
Moisture . .	12·52 per cent	8·55 per cent	8·23 per cent
Protein . .	17·78 „	38·52 „	45·22 „
Oil . . .	1·19 „	7·39 „	8·84 „
Fibre . .	9·36 „	7·49 „	6·09 „
Ash . .	3·95 „	6·35 „	6·59 „
Soluble Carbos. (by difference)	55·20 „	31·70 „	25·03 „

The feeding time-table for all the groups of sheep was as follows :—

Daylight.—One-half of the daily allowance of concentrates, followed by one-third of the daily allowance of swedes.

Mid-day.—One-third of the daily allowance of swedes.

Afternoon.—One-half of the daily allowance of concentrates, followed by one-third of the daily allowance of swedes.

In the case of the three groups getting hay, the daily allowance of ¼ lb. per sheep, 9 lb. for the group, was put into the sheep racks each afternoon.

In the actual feeding, the method adopted was to give each group the concentrate ration, starting at Group 1, and by the time the four groups were attended to, the sheep in the first group had cleaned up the concentrates and were ready for their root ration; the second, third and fourth groups received theirs in rotation.

After the first few days the allowance of swedes was, on the whole, well cleared, particularly in the case of Group 4, to which no hay was fed. Group 2 came next in order in that respect. If, on any day, the sheep did not entirely clean up their allowance of swedes, what remained was removed from the troughs before a fresh supply was given. The amount that had to be rejected, however, was small.

Of the various concentrate mixtures used, the one least relished was that including Palm Kernel Meal, but though the hoggets did not appear to have any special liking for the Palm Kernel ration, they nevertheless always cleared up the full daily allowance. Just before the end of the trial, however, when the amount had risen to 1½ lb. daily, they were a little slower in clearing the troughs. In that connection it has to be kept in view that the Palm Kernel Meal is a very bulky food, hence its inclusion in the proportion fed gave rise to a very bulky ration, and one quite different from the others in that respect.

The mixtures including Cotton Seed and Decorticated Ground Nut seemed to prove more attractive; nevertheless there were a few sheep in Groups 2 and 3 which did not come readily to the troughs until near the end of the feeding trial, and as the rate of progress of these hoggets was much poorer, that naturally lowered the average for the whole group. A reference to the individual weights given in the Appendix will make this clear. The exclusion of these hoggets, however, while slightly raising the average increase for the remainder, would not have materially affected the result.

Apart from the individual weights of the sheep as taken at the commencement of the trial, when they were tattooed and given a serial number for easy identification, the groups were weighed periodically on the cattle weighbridge in order to test their progress. At the end of the trial the individual weights were again taken on the self-recording machine. The average live weight of the hoggets in each of the groups at the commencement and finish of the trial and the average live-weight increases were as follows :—

Group	Ration	Number of Sheep	Average Live Weight at		Average Live-Weight Increase	
			Start	Finish	For 9-week Period	Per day
			lb	lb	lb	lb
1	Palm Kernel Meal	36	70·8	87	16·2	·25
2	Dec. Cotton Seed Meal	36	70·8	86	15·1	·24
3	Dec. Ground Nut Meal	36	70·8	89	18·2	·29
4	Dec. Cotton Seed Meal No Hay	36	70·8	85	14·1	·22

On the conclusion of the trial the four groups of sheep were very carefully handled, with a view to noting any differences in condition resulting from the feeding of the different rations. Despite the greater live-weight increase from Group 3, it was the unanimous opinion of all who handled the sheep that the hoggets comprising Group 2, and which had been on the Decorticated Cotton Seed Meal ration, were in the best condition. With the exception of one or two which had been slow in taking to the trough feeding, all in that group were ready for the butcher.

There was little difference betwixt Groups 3 and 4, most of which were likewise ready for slaughter, though a few were not. In the case of Group 1 there were a number of well-finished sheep, probably hoggets that had all along taken rather more than their due share of concentrates ; but while that was so, this group contained more sheep that were not quite ready for the market than any of the other groups.

The view just expressed was to some extent confirmed by the prices realised in the open market, to which a consignment of seventy sheep was sent in the end of January at the conclusion of the trial.

The numbers sold from each group and the average prices realised for these were as follows :—

Group	Ration	Numbers Sold	Average Price
1	Palm Kernel Meal	16	36s. 9d.
2	Decorticated Cotton Seed Meal	18	38s. 9d.
3	Decorticated Ground Nut Meal	18	36s. 3d.
4	Decorticated Cotton Seed Meal, and no Hay	18	36s.

Through the courtesy of the buyers of the sheep the carcass weights of the different groups were obtained, and as the live weights of the sheep sold were known, the per cent. carcass weight to live weight was also ascertained.

The live weights, carcass weights, and per cent. carcass weight to live weight, for the sheep sold, were as follows :—

GROUP.	Ration.	Number of Sheep.	Average.		Per cent. Carcass Weight to Live Weight.
			Live Weight.	Dead Weight.	
			lb.	lb.	%
1	Palm Kernel Meal	16	92	46·6	50·9
2	Dec. Cotton Seed Meal	18	92·4	46·7	50·5
3	Dec. Ground Nut Meal	18	92·6	46·7	50·4
4	Dec. Cotton Seed Meal. No Hay	18	87·4	44·8	51·2

In view of the fact that the sheep were sold in lots of eight and nine, and ultimately distributed over six different buyers, too much stress should not be put on carcass weights, or per cent. carcass weight to live weight, as delay in slaughtering or the method of dressing might easily account for a difference of 1 or 2 lb. in the actual weight returned ; this, indeed, is possibly an explanation of the rather lower carcass weights from Groups 2 and 3 relative to the other two groups.

The foregoing figures would appear to indicate that while there is little difference in the per cent. of carcass weight to live weight in all of the groups, the no-hay group is slightly the best in that respect. That is pretty much in keeping with what one would expect, as the hay requires longer for digestion than swedes and concentrates. It absorbs and retains moisture, remains rather longer in the digestive tract and adds slightly to the live weight.

Despite the fairly wide variation in the Protein Content of the three feeding-stuffs tested, there was little difference in the results from the rations containing these, and it would seem as if even the ration containing Palm Kernel Meal supplied a sufficiency of Protein.

Of the three meals compared, and on the basis of actual live-weight increase, the Decorticated Ground Nut Meal gave fully the best result. On the other hand, the sheep on the ration containing Cotton Seed Meal handled exceptionally well, and brought the highest price in the open market, but were a little behind as regards live-weight increase.

Based on the average daily consumpt for the entire feeding period, the composition of the rations in terms of Dry Matter, Starch Equivalent and Protein Equivalent were approximately as follows :—

COMPOSITION OF THE DIFFERENT RATIONS.

	Palm Kernel Meal.	Decorticated Cotton Seed Meal.	Decorticated Ground Nut Meal.	Decorticated Cotton Seed Meal. No Hay.
	lb.	lb.	lb.	lb.
Total Dry Matter (Appetite)	2·4	2·4	2·4	2·2
Starch Equivalent	1·7	1·7	1·7	1·6
Protein Equivalent	0·23	0·31	0·34	0·29

It has already been shown that at the commencement of the trial the hoggets averaged just a little over 70 lb. in live weight and at the end were approaching 90 lb., the average over the feeding period being almost 80 lb.

The amounts indicated above, however, proved ample to satisfy the appetites of the sheep.

All of the rations in terms of total Dry Matter were rather below the amounts recommended in the publication of the Ministry of Agriculture and Fisheries, Bulletin 48, " Rations for Live Stock," by the late Professor T. B. Wood and revised by Dr Woodman, and which gives the daily Dry Matter requirement of sheep scaling 80 lb. as 3 lb. There is fairly close agreement, however, with regard to the Starch Equivalent requirements and the amounts supplied by the rations, and the actual live-weight increase obtained is only just a little below the calculated theoretical increase expected.

Financial Aspect.—The three feeding-stuffs under trial, although entirely different in composition, were very similar in price. There was therefore practically no difference in the costs of the rations, excepting in the case of that for Group 4, which did not include hay, and was, in consequence, the cheapest.

Considering the feeding as a whole, and taking into account only the 70 sheep sold at the end of the trial, some indication of the return for swedes consumed can be arrived at. The remainder of the sheep comprising the groups, after 36 of the poorest had been selected for indoor feeding, were put into one lot and fed on Ration 3 for a short time prior to being sent to the fat market. In the interval there was a rise in the value of mutton and higher prices were obtained. Disregarding these, and only taking into account the return for the 70 sheep already referred to, the following gives an indication of the price realised for each ton of swedes fed to them.

Outlay.	*s.*	*d.*	*Return.*	*s.*	*d.*
In-buying price of hoggets	22	6	Average price realised for the 70 hoggets sold	36	11
Grazing on old grass, 6 weeks at 3d.	1	6			
Concentrates and hay	4	4			
Labour		9			
Purchase and sale expenses	1	6			
Balance to meet cost of swedes consumed	6	4			
	36	11		36	11

As the average amount of swedes fed daily over the nine-week period was 11 lb., the total amount per hogget was 6 cwt. 21 lb. The sheep, therefore, apart from improving the land, left approximately £1 per ton for the swedes sold to them and consumed by them on the ground.

II. Dried Sugar Beet Pulp.

In order to ascertain the extent to which Dried Sugar Beet Pulp might be safely introduced into a ration for sheep, after the hoggets required for Experiment 1 had been selected from the nine score originally available, 32 of those remaining were utilised for a feeding trial with Sugar Beet.

These were enclosed in a section of about 1½ acres in extent, and on which, as in the case of the other sections, a silage crop had been grown. There was a certain amount of aftermath from the silage crop, and that kept the sheep going until they were fully accustomed to the trough food.

The concentrate ration fed to this group was similar in composition to that for Group 3 in the previous experiment, namely :—

1 part Crushed Oats.
1 part Kibbled Maize.
½ part Dried Grains.
1½ part Decorticated Ground Nut Cake.

The daily allowance of concentrates was restricted to 1 lb. throughout the whole trial.

The Sugar Beet Pulp was fed mixed with the concentrates, a start being made with a daily allowance of 1 lb of Beet Pulp, but this was increased by ¼ lb. each week until a maximum of 2 lb. was reached in the fifth week.

The method of rationing and the total Dry Matter content of the ration were as follows :—

Week of Experiment.	Concentrate Allowance.	Dried Sugar Beet Pulp Allowance.	Total Ration.	Total Dry Matter Content.
	lb.	lb.	lb.	lb.
1st	1	1	2	1·76
2nd	1	1¼	2¼	1·98
3rd	1	1½	2½	2·20
4th	1	1¾	2¾	2·42
5th	1	2	3	2·64

The sheep had access to water at all times, as there was a small stream on one side of the section in which they were enclosed. It was readily apparent that hoggets on a dry ration of this sort required a considerable amount of water, as they drank very freely thereof.

The 32 hoggets in this experiment, while weighed individually at the beginning and end of the feeding period, were not tattooed in the ears; consequently, while the average weight of the sheep in the group at the beginning and end of the trial could be arrived at, the individual progress of each sheep could not be known with certainty.

The trial started on the 14th December and was continued for a period of five weeks, terminating on the 18th January. The average live weight of the hoggets at the start and finish of the trial, and the variation in their live weights, were as follows :—

AVERAGE LIVE WEIGHT.

Start.	*Finish.*
lb.	lb.
76·5	83·5

VARIATION IN WEIGHT.

Start.	*Finish.*
64 lb. to 89 lb.	69 lb. to 101 lb.

Average increase per sheep for five-week period . .	7 lb.
Average daily increase per sheep	·20 lb.

The average Dry Matter allowance per sheep supplied by this ration rose from 1·7 lb. daily at the commencement of the trial to 2·6 lb. at the end. These amounts were, of course, supplemented, particularly during the first two weeks, by the grazing provided in the aftermath from the silage crop.

This short trial indicated clearly that if Sugar Beet Pulp be introduced into the ration and gradually increased, as much as 2 lb. daily of Beet Pulp, in addition to 1 lb. of mixed concentrates, may ultimately be fed to hoggets of about 80 lb. live weight without any harmful effects. Hoggets getting Dried Beet Pulp, however, must have access to water, as their requirements in that connection are heavy.

III. Indoor Feeding.

Concurrently with the first sheep-feeding experiment dealt with, a cattle-feeding experiment was in progress with the same three feeding-stuffs.

The cattle were sold early in January, and as the pens were not required for another group of cattle until towards the end of February, it was decided to use them for a sheep-feeding trial. They were accordingly cleaned out, and every second divisional gate swung round in order to double their size, making them 20 ft. by 10 ft. instead of the normal 10 ft. by 10 ft.

Six groups of sheep were arranged with six animals in each, one group being housed in each pen.

As the rations fed to these six groups were, in the case of the first three, identical with those used in Experiment I. already dealt with, and in which Palm Kernel Meal, Decorticated Cotton Seed Meal and Decorticated Ground Nut Meal had been compared, this was, in one sense, really a continuation of that trial, especially as the hoggets put on these rations were drawn from the groups receiving the corresponding rations out of doors and to which they were already fully accustomed.

A fourth group received a similar basal ration to that of the first three groups, but with a mixture of Palm Kernel, Cotton Seed and Earthnut Meals in equal amounts instead of a single meal.

Groups 5 and 6 received rations similar to Group 3, excepting that for Group 5 half of the swedes were replaced with Silage and for Group 6 half were replaced with Sugar Beet Pulp. The full scheme of rationing was as follows :—

GROUP 1.—1½ lb. Concentrate Mixture, including Palm Kernel Meal ; Swedes, 12 lb. ; Hay *ad lib.*

GROUP 2.—1½ lb. Concentrate Mixture, including Decorticated Cotton Seed Meal ; Swedes, 12 lb. ; Hay *ad lib.*

GROUP 3.—1½ lb. Concentrate Mixture, including Decorticated Ground Nut Cake ; Swedes, 12 lb. ; Hay *ad lib.*

GROUP 4.—1½ lb. Concentrate Mixture, including Palm Kernel, Cotton Seed and Ground Nut Meal ; Swedes, 12 lb. ; Hay *ad lib.*

GROUP 5.—1½ lb. Concentrate Mixture, including Ground Nut Meal, half of Swedes replaced with Silage on basis of 1 lb. Silage to 2½ lb. Swedes.

GROUP 6.—1½ lb. Concentrate Mixture, including Ground Nut Meal, half of Swedes replaced with Sugar Beet Pulp on basis of 1 lb. of Beet Pulp to 7 lb. of Swedes.

All of the groups appeared to take quite kindly to the indoor feeding and seemed very contented, but it was soon apparent that the appetites were not so good as when the sheep were in the open and moving about more. The daily amounts allowed proved rather much, and sometimes a little food was left in the troughs.

The average live weight of the hoggets at the commencement and finish of the trial, the live-weight increase for the five-week period, and the average daily live-weight increases, were as follows :—

GROUP.	Number of Sheep.	Average Live Weight.		Average Live-Weight Increase for 5-week Period.	Average Daily Live-Weight Increase.
		Start.	Finish.		
		lb.	lb.	lb.	lb.
1	6	84⅙	89⅙	5	·14
2	6	84	91⅓	7⅓	·21
3	6	84	95⅓	11⅓	·32
4	6	84	93⅙	9⅙	·26
5	6	83⅚	90⅙	6⅓	·18
6	6	83⅚	91⅚	8	·23

A reference to Appendix II. giving the individual weights for the six hoggets in each of the six groups will show that the rate of progress has, on the whole, been rather variable ; indeed much more so than in the case of the outdoor feeding. The sheep in Group 3—Decorticated Ground Nut Meal Ration—made particularly good progress, only one hogget in the group of six failing to give an increase of at least 2 lb. per week. This result confirms to some extent that from the outdoor group of 36 fed on a similar ration, and which from the point of view of live-weight increase made the best response to the feeding.

Group 4, which was on the composite ration containing the three special meals in equal amounts, came next in order, but Group 1, which received the Palm Kernel Meal ration, was disappointing, and no hogget gave an increase of 2 lb. per week. Although the sheep on this ration had been drawn from a group of 36 receiving Palm Kernel Meal, they did not take nearly so well to it indoors, and sometimes failed to clear their troughs.

The Dried Sugar Beet Pulp proved a very good substitute for Swedes, and hoggets on this ration did quite well. The same could be said with regard to the group on Silage, if one hogget which lost 2 lb. during the feeding period is excluded.

While the sheep were confined in the pens, a liberal use was made of sawdust, and there was comparatively little trouble with their feet.

Taking the result from the indoor feeding as a whole, there was no material benefit as compared with the outdoor feeding, excepting in the case of the Decorticated Ground Nut Meal group, which gave a higher daily increase than that obtained when the same ration was fed to sheep in the open.

IV. Relative Values of Swedes, Silage and Beet.

In the indoor feeding experiments, Silage and Beet Pulp were used to replace half of the daily allowance of Swedes, but in this trial these foods were used to replace the swedes entirely.

For the trial half-bred hoggets (Border Leicester ram and Cheviot ewe) were employed, and three uniform groups with eight animals in each were arranged. These groups were treated exactly alike, excepting that Group 1 was given Swedes; Group 2, Silage; and Group 3, Sugar Beet Pulp.

Use was made of some of the poultry runs which were vacant at that time, the three groups of sheep being put into three separate runs. The area of each of these enclosures was a little under one-twentieth part of an acre, the dimensions being 15 by 14 yards. The runs were in grass, and furnished a fair amount of grazing. When they had been well eaten down and the ground was well trampled, the sheep were moved to fresh runs.

In view of the fact that the runs provided a certain amount of grazing and that the Concentrate and Hay allowance was liberal, the Swedes for Group 1 were restricted to a daily allowance of 8 lb. For Group 2 these were replaced by 3 lb. Silage and in the case of Group 3 by 1 lb. Sugar Beet Pulp.

The concentrate ration fed was the one including Decorticated Ground Nut Meal, and which in the other trials had, from the point of view of live-weight increase, given the best return. The commencing daily allowance was 1½ lb., and this was gradually increased to a maximum of 2 lb. Hay was fed *ad lib.*, and water was provided.

The hoggets took fairly freely to the different rations, but were a little slower in clearing up the silage. There was a certain amount of disturbance, which at first doubtless retarded, to some extent, the progress made by the hoggets, but they very soon settled down, and considering that they were well forward in condition at the time the trial commenced, the rate of progress for two of the groups was, on the whole, quite satisfactory.

At the end of the trial the hoggets were sold on a dead-weight basis. The average live-weight increase at the start and finish of the experiment, and the per cent. carcass weight to live weight, were as follows :—

GROUP.	Number of Sheep.	Average Live Weight.		Live Weight Increase.	Per cent. Carcass Weight to Live Weight.
		Start.	Finish.		
		lb.	lb.	lb.	%
1	8	97	103¼	6¼	50·0
2	8	97	101¼	4¼	48·8
3	8	97	106¼	9¼	50·5

The conditions under which this trial was carried out, though not particularly favourable, were nevertheless similar for all the groups. The number of sheep employed was insufficient for the results to be taken as conclusive, but they are at least suggestive, and would appear to indicate that, while Swedes are superior to Silage for sheep, Sugar Beet Pulp is an effective substitute for Swedes.

Summary.

The results of the feeding trials briefly reviewed would seem to indicate as follows :—

1. That in the winter feeding of sheep for the production of mutton, a somewhat restricted allowance of Swedes supplemented with a fairly liberal ration of concentrates is, when assessed on the basis of live-weight increase, distinctly superior to a more liberal allowance of Swedes and a relatively smaller ration of concentrates.

Apart from that aspect of the matter, by restricting the Swede ration and increasing the concentrate allowance, a larger number of sheep can be fattened per acre of roots; further, the extra concentrates consumed tend to the greater enrichment of the land.

2. That, despite the great difference in the Protein Content of Palm Kernel, Cotton Seed and Ground Nut Meals, there is little difference in the results obtained from these feeding-stuffs, even when they are incorporated in the ration to the extent of 1½ parts in 4 (37½ per cent). From the point of view of live-weight increase, any advantage that there is seems to

be with the Ground Nut, and its superiority was more pronounced in the indoor than in the outdoor feeding trial.

3. That Dried Sugar Beet Pulp may be used to replace Swedes in whole or in part. That 1 lb. Beet Pulp will effectively replace 7 or even 8 lb. of Swedes. That it may be fed dry, provided the sheep have access to water, and that as much as 2 lb. daily may be given to hoggets of medium size without any bad results accruing.

4. That Silage appears to be, on the whole, less suitable for fattening hoggets than Swedes or Beet Pulp ; but that it can, nevertheless, be used to replace half of the Swede allowance with fairly satisfactory results. As a substitute for the entire ration of Swedes it is not likely to prove a great success.

5. That the per cent. of carcass weight to live weight is likely to be quite as high from Sugar Beet Pulp as from Swedes, but Silage is in that respect rather inferior to either of these foods.

6. That 2·4 lb. total Dry Matter seems sufficient to satisfy fully the appetites of cross hoggets (Border Leicester ram, Blackfaced ewe) scaling about 80 lb. live weight.

Note of Acknowledgment.

This opportunity is taken to tender thanks to all who assisted in any way in the carrying out of the sheep feeding trials, and in particular to Mr Cochrane, the Supervisor of Experiments.

APPENDIX I.

INDIVIDUAL WEIGHTS OF THE HOGGETS IN EACH OF THE GROUPS AT THE COMMENCEMENT AND CONCLUSION OF THE EXPERIMENT AND THEIR LIVE-WEIGHT INCREASES.

GROUP 1. PALM KERNEL MEAL.

Sheep No.	Weight at Start. 13/11/33.	Weight at Finish. 15/1/34.	Live-Weight Increase.
	lb	lb	lb.
1	75	91	16
2	73	86	13
3	74	90	16
4	63	78	15
5	70	83	13
6	68	79	11
7	70	86	16
8	66	78	12
9	68	84	16
10	69	85	16
32	65	79	14
33	79	91	12
34	66	88	22
35	72	89	17
36	62	71	9
37	66	80	14
38	75	92	17
39	79	102	23
40	68	85	17
41	76	94	18
42	78	93	15
43	72	89	17
44	68	80	12
45	67	85	18
46	70	92	22
47	67	79	12
48	69	85	16
49	72	82	10
50	74	94	20
71	66	84	18
75	72	91	19
76	80	100	20
77	71	87	16
78	79	99	20
80	71	88	17
142	72	95	23
Total . 36	2552	3134	582
Average .	70·8	87	16·2

GROUP 2. DECORTICATED COTTON SEED MEAL.

Sheep No.	Weight at Start. 13/11/33.	Weight at Finish. 15/1/34.	Live-Weight Increase.
	lb.	lb.	lb.
11	70	87	17
12	70	92	22
13	75	79	4
14	67	76	9
15	74	84	10
16	71	86	15
17	71	91	20
18	62	62	0
51	68	82	14
52	73	90	17
53	70	88	18
55	80	96	16
56	80	105	25
60	69	84	15
121	67	79	12
123	69	86	17
124	72	90	18
125	66	76	10
126	78	97	19
127	76	97	21
128	75	90	15
129	81	104	23
130	66	72	6
131	81	97	16
132	64	76	12
133	76	98	22
134	63	76	13
135	75	89	14
136	75	101	26
137	72	90	18
138	62	68	6
139	68	77	9
140	68	86	18
141	66	77	11
151	64	84	20
20	68	81	13
Total . 36	2552	3093	541
Average .	70·8	86	15·1

Group 3. Decorticated Ground Nut Meal.

Sheep No.	Weight at Start. 13/11/33.	Weight at Finish. 15/1/34.	Live-Weight Increase.
	lb.	lb.	lb.
54	79	102	23
57	68	82	14
58	79	105	26
59	65	79	14
72	73	89	16
74	79	106	27
92	71	93	22
93	72	92	20
94	72	96	24
95	67	81	14
96	76	93	17
97	66	87	21
101	73	93	20
102	73	92	19
103	73	100	27
104	74	83	9
105	69	80	11
106	69	89	20
107	67	84	17
108	68	77	9
109	72	96	24
110	70	85	15
111	71	82	11
112	66	83	17
113	74	82	8
114	64	80	16
115	70	101	31
116	76	91	15
117	72	85	13
118	73	102	29
119	68	87	19
120	69	76	7
148	64	72	8
149	74	104	30
150	70	97	27
100	66	81	15
Total . 36	2552	3207	655
Average .	70·8	89	18·2

GROUP 4. DECORTICATED COTTON SEED MEAL. NO HAY.

Sheep No.	Weight at Start. 13/11/33.	Weight at Finish. 15/1/34.	Live-Weight Increase.
	lb.	lb.	lb.
17A	71	81	10
21	64	75	11
22	74	90	16
23	65	76	11
24	73	86	13
25	69	79	10
26	66	75	9
27	67	76	9
28	73	90	17
29	66	77	11
30	72	87	15
67	69	80	11
67A	68	82	14
68	68	81	13
69	70	85	15
70	73	89	16
61	73	90	17
63	68	82	14
64	83	103	20
65	69	82	13
73	72	88	16
79	80	96	16
81	73	85	12
82	63	74	11
83	63	73	10
84	76	93	17
85	81	101	20
87	66	82	16
89	79	97	18
90	70	92	22
143	68	90	22
145	80	87	7
144	72	80	8
146	72	79	7
147	72	89	17
152	64	89	25
Total . 36	2552	3061	509
Average .	70·8	85	14·1

APPENDIX II.

INDIVIDUAL WEIGHTS OF THE HOGGETS IN EACH OF THE SIX GROUPS AT THE COMMENCEMENT AND CONCLUSION OF THE INDOOR FEEDING EXPERIMENT.

GROUP 1. PALM KERNEL MEAL.

Sheep No.	Weight at Start.	Weight at Finish.	Live-Weight Increase.
	lb.	lb.	lb
1	86	87	1
2	83	92	9
3	90	94	4
4	84	87	3
5	78	84	6
6	84	91	7
Total . .	505	535	30
Average .	84⅙	89⅙	5

GROUP 2. COTTON SEED MEAL.

1	95	104	9
2	80	88	8
3	98	103	5
4	76	82	6
5	76	86	10
6	79	85	6
Total . .	504	548	44
Average .	84	91⅓	7⅓

GROUP 3. GROUND NUT MEAL.

1	81	92	11
2	85	98	13
3	93	103	10
4	85	93	8
5	96	112	16
6	64	74	10
Total . .	504	572	68
Average .	84	95⅓	11⅓

GROUP 4. PALM KERNEL, COTTON SEED AND EARTHNUT MEALS.

Sheep No.	Weight at Start.	Weight at Finish.	Live-Weight Increase.
	lb.	lb.	lb.
1	85	89	4
2	85	98	13
3	95	105	10
4	81	91	10
5	78	87	9
6	80	89	9
Total . .	504	559	55
Average .	84	93⅙	9⅙

GROUP 5. GROUND NUT MEAL, HALF SWEDES REPLACED WITH SILAGE.

1	94	103	9
2	82	87	5
3	92	98	6
4	76	89	13
5	76	83	7
*6	83	81	−2
Total . .	503	541	40
Average .	83⅚	90⅙	6⅓

* Excluding Sheep No. 6, the average live-weight increase is 8 lb.

GROUP 6. GROUND NUT MEAL, HALF SWEDES REPLACED WITH DRIED SUGAR BEET PULP.

1	91	101	10
2	64	68	4
3	85	95	10
4	96	110	14
5	81	84	3
6	86	93	7
Total . .	503	551	48
Average .	83⅚	91⅚	8

INSECT AND OTHER ANIMAL PESTS OF 1933.

By R. STEWART MACDOUGALL, M.A., D.Sc., LL.D.,
Consulting Entomologist to the Society.

THE COLORADO BEETLE (Fig. 52).[1]

MEMBERS of the Society will recall that in view of new and severer legislative enactments against the import of potatoes from France and other countries I gave an account of the Colorado Beetle as an enemy of the potato crop, and of its spread from Colorado to Europe. Within a few months of the publication of the 'Transactions' for 1933, a crushed specimen of the Colorado Beetle was discovered, on August 21, by Mr A. S. Buckhurst of the Ministry of Agriculture's Plant Pathological Laboratory,[2] on the landing-stage of the Tilbury - Gravesend Ferry, while he was taking a chance holiday walk at Tilbury Docks.

A very thorough inspection of the allotments and the potato crops in the neighbourhood followed. No Colorado Beetles or their larvæ were found above ground on the crop plants, but, on August 23, two adult beetles were found in the soil of an allotment about half a mile from the Ferry. The potato plants above showed signs of having been eaten, and the beetles had probably entered the soil to pass the winter. Most intensive search yielded thirty additional Colorado Beetles taken from the soil of allotments and gardens adjacent to Tilbury Docks. These beetles would have over-wintered in the soil to have come above ground in 1934 for feeding, pairing and egg-laying.

There was detailed inspection of all potato plots and allotments in the neighbourhood of places where beetles had been found, and a survey was made of all food crops within a radius of ten miles of the Tilbury allotments. Allotments in the actual neighbourhood of where the beetles were found were treated to soil fumigation with bisulphide of carbon, and field crops were sprayed with an arsenical spray, as annihilative and protective measures.

Further inspection in the spring and early summer of 1934, when normally the insects would leave their winter quarters and come above ground, will reveal to what extent beetles may have escaped the treatment, and whether some may show in new areas.

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[1] Illustrations of the Beetle, its eggs and grubs, to aid in identification, appeared in the 'Transactions' of 1933.

[2] 'Colorado Beetle at Tilbury,' by J. C. F. Fryer, O.B.E., M.A., Director, Ministry of Agriculture Plant Pathological Laboratory, Harpenden, in 'Journal of Ministry of Agriculture,' January 1934.

The Colorado Beetle caused a scare when it appeared in England in 1901, at Tilbury Docks, only to be annihilated by drastic treatment, and that the beetle should have appeared again in 1933 at the same place is interesting.

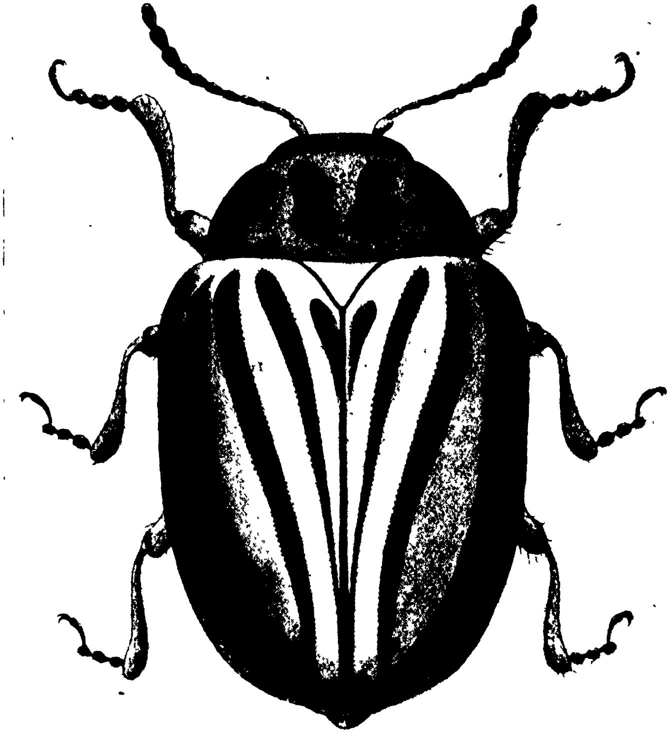

Fig 52.—*The Colorado Beetle* (Leptinotarsa decemlineata).

Drawn from nature. Enlarged. The natural size is ½ inch long, ⅓ inch broad.

Such 'scares' reach the man in the street in various indirect ways. In 1901 the Colorado Beetle scare gave rise to a song in the repertoire of the Moore and Burgess Minstrels, a famous troupe of by-gone days.

The chorus began—

"If you see a beetle at large
Call a Bobby and give him in charge."

The singer, wearing boots of exaggerated size, stamped about the stage pretending to be crushing beetles, the audience gaily joining in the chorus and the stamping.

And now, again,[1] the insect has stimulated the muse to humorous appeal:—

"Great Cæsar and the Catos
And Cincinnatus[2] too
Got on without potatoes
And minus Irish stew;
But Britons, peer or peasant,
Or princes of the blood,
Cannot dispense at present
With the nutritious spud.

"O Elliot, gallant Walter,
To you for help we turn,
Let not your courage falter
But ever brighter burn.
A corps of beetle busters
We beg you, swiftly raise,
Armed not with knuckle dusters
But syringes and sprays."

THE TURNIP FLY OR FLEA BEETLE.
(*Phyllotreta nemorum.*)

This insect, in spite of its common names, is neither a fly nor a flea. True flies have only two wings and fleas have none, though nature has compensated them by length and strength of limb. The name flea beetle is due to the springing or leaping habit of the beetle on being approached or touched. The family of Flea Beetles contains a number of species affecting plants of different orders—*e.g.*, potatoes, mangolds, hops, cereals. We hear most about the species which attack cruciferous crops, and *P. nemorum* is one of them.

There is some confusion as to species of these closely related beetles, and the student who wishes to make a study of species should consult the work of Mr H. C. F. Newton, B.Sc., as described in the 'Journal of the S.E. Agricultural College,' Wye.[3] Newton names fourteen *Phyllotreta* species and deals more or less fully with eight of them. Of these eight, six feed as grubs at the roots of crucifers; one—viz., *Phyllotreta vittula*—attacks, in addition to crucifers, oats, barley, wheat, rye, maize, and one only, *P. nemorum*, as larva, mines in the soft tissue of the leaf.

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[1] 'Punch,' 13/9/33.

[2] Cincinnatus was a great farmer as well as a great soldier.

[3] 'The Biology of Flea Beetles (*Phyllotreta*), attacking cultivated cruciferæ, and Experiments in the Control of Flea Beetles of the genus *Phyllotreta*, injurious to cultivated cruciferous crops,' by H. C. F. Newton, B.Sc., in the 'Journal of the S.E. Agricultural College,' Wye, Kent, 1928. Also 'Observations on the Biology of some Flea Beetles of economic importance,' by H. C. F. Newton, B.Sc., in 'Journal of S.E. Agricultural College,' Wye, 1929.

TURNIP FLY.

Before dealing in detail with the Turnip Fly it is well to emphasise certain points about the feeding habits of the Flea Beetles of cruciferous crops.

A. The main damage is done by the adult beetles in three different ways and at three different times.

1. The beetles come from their winter quarters in spring, and when the tender seedlings are breaking their way through the soil to the surface, and before they have reached the surface, these beetles, which may leave crucifer weed-plants for the purpose, enter the cracking or breaking soil and attack the sprouting plants. The baby plants from the germinating seeds can be destroyed in numbers, especially if the tender parts of the seedling just below the appearing seed-leaves (the *hypocotyl*) be gnawed. This means that the seedlings are doomed before they really show above ground.

2. The beetles that have overwintered attack the seed-leaves (*cotyledons*) and the above-ground parts of the plants that have made some progress in germination. Many plants in this still tender stage may be destroyed.

3. Later, these same overwintered beetles attack plants in the rough-leaf stage, an attack which is not very harmful, and with some crucifers can be neglected. Newton tells us that white turnip, among cultivated crucifers, suffers the worst damage from its being eaten in the older stages.

4. The new generation of beetles that comes away in late summer eats the foliage of the now well-grown plants; this damage is not serious.

B. The larvæ or grubs feed at and on the roots. In the case of *P. nemorum* and sometimes *P. undulata*, the larvæ mine and tunnel the leaves. If the tunnels be numerous there is, of course, loss of feeding area, and the tubers will consequently be smaller.

Phyllotreta nemorum.

The beetle measures about $\frac{1}{10}$ inch in length; down each wing-cover (*elytron*) runs a yellow stripe or band which may be somewhat wavy; the middle region of the legs is reddish-yellow.

The full-fed grub measures $\frac{1}{4}$ inch in length; the colour is yellowish, with the body showing a regular succession of dark horny plates; the head is dark and carries jawed, biting mouth-parts; there are three pairs of legs on the fore-body, and a muscular projection on the under surface of the last joint.

Life-history.—The winter is passed by the adult beetles in such shelter places as under bark scales, in holes in trees, in rubbish heaps, in tufts of grass, among weeds, under fallen leaves, in the bottom of haystacks.

In spring these beetles come from their winter quarters and may feed for a time on crucifer weeds until the turnip or other cultivated crucifer is ready. The various types of damage at different stages in the plant's life have been detailed above.

The females lay their eggs in the soil, or sometimes on the leaves of charlock, radish and other crucifers. The grub from the egg climbs up the stem, enters the rough-leaf and tunnels, for feeding purposes, in the soft part of the leaf (*mesophyll*), leaving behind a trail of dark excrement. When full grown the grub leaves the leaf and enters the soil for pupation. As a rule, with this species, the pupa is found near the surface, under cover of a little earthen chamber. The pupal stage is soon over and the new beetles come to the surface and pass to crucifer plants for feeding. The whole life-cycle—egg, larva, pupa, beetle—is passed through in five to six weeks or a little longer, so that two, and perhaps more, generations can occur. The beetles of the last generation of the year feed for a time and then hibernate.

In his observations and experiments at Wye, Newton found the plants attacked by *P. nemorum* to be turnip, radish, charlock, black mustard, white mustard, with a decided preference for radish among the cultivated crucifers. Newton never found *P. nemorum* on cabbage or swede, in the field, but he bred the beetle through all its stages, on cabbage, in the laboratory.

The species *P. undulata* is in some localities more numerous than *P. nemorum;* it is a general pest of cultivated crucifers. *P. undulata* is rather smaller than *P. nemorum*, and the two yellow stripes or bands on the wing-covers tend to curve inwards ; further, the middle region of the legs is black. *P. undulata* lays her eggs in the soil and the grubs from the eggs feed on the roots. Pupation is in the soil under cover of an earthen cell. The length of the life-cycle is roughly six weeks.

P. cruciferæ, *P. atra*, *P. nigripes* in life-history and habits resemble *P. undulata.*

Relation to Environment.—The Turnip Fly affords an interesting example of how conditions that favour the crop disfavour the insect, and *vice versa.* Thus turnip seedlings from seed with a good vitality of germination may be up and their seed-leaf or smooth-leaf stage over before the beetles are in great numbers.

A good seed-bed favours the plant; cloddy soil favours the beetle as offering shelter places.

Land in good tilth, even with only moderate moisture, is in favour of the plant, whereas cloddy soil is against it by encouraging loss of moisture by evaporation; the weakened plants more readily fall before the beetle.

Moisture favours the crop, the beetles prefer dry conditions. The beetles riot in sunshine—a hot spell in May may bring them in thousands; the plants drag in conditions of drought.

Wet weather in early summer may mean unusual scarcity of beetles and little damage.[1]

Control.—Such cultural operations as will favour the crop plant, including the clearing out of hedge bottoms and the destruction of refuse, for the purpose of destroying winter shelter.

Deterrents.—Spreading on the drills sand or sawdust steeped in paraffin.

Paraffin Emulsion—paraffin, 2 pints; soft soap, 1 lb.; water, 10 gallons, is used as a deterrent spray. Newton in his experiments found this inferior to a nicotine sulphate spray, 0·2 to 0·5 per cent of nicotine sulphate content, with free soft soap in solution, at the rate of 4·5 lb. per 100 gallons. The nicotine sulphate sprayed twice or three times at four days' interval gave protection in the earlier stages of attack.

Dressing the seed before sowing, with paraffin or turpentine, "a dessert spoonful of either for 7 lb. of seed," is a practised measure concerning the efficacy of which there is considerable difference of opinion. Newton in his experiments found the method sometimes successful, at other times without satisfactory result.

Jenkins [2] experimented in field and laboratory with a tea cupful of paraffin or rather less turpentine to one pound of seed, care being taken that every seed should receive its share of the dressing. Not only did treated seed germinate in higher percentage but infestation by the beetle was appreciably reduced. Conditions of success were that the seed after treatment should be allowed thoroughly to dry and then be drilled at once after drying.

A dressing of the young plants with soot and quicklime is a not uncommon suggested measure for keeping away the beetles, but this is not practical for a large acreage. Soot in any considerable quantity is not obtainable on short notice.

Trapping the beetles.—Trap the beetles when they are at work on the plants by taking advantage of their fondness for sunshine and their leaping habit when disturbed. Fix a light wide framework on wheels, supporting well-tarred boards, the tar being spread on the underside; arrange that the boards are just over or very slightly higher than the plants;

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[1] "Insect Pests of Crops, 1928-1931." Bulletin No. 66 of the Ministry of Agriculture and Fisheries, page 31.

[2] "Seed treatment as a means of preventing Turnip Flea Beetle attack," by J. R. W. Jenkins, in 'The Welsh Journal of Agriculture for 1928.'

push this light structure up and down the field. The leaping beetles are caught on the tar. Hundreds of beetles may be caught in this way if the boards are kept well tarred.

There are numerous patterns of such traps. Concerning them Newton says (1) "They must be lightly made so as to be easily worked by a man or boy, and as wide as possible without becoming unwieldy; (2) they must be pushed, not drawn; (3) they should be used when the beetles are most active, in the warmer part of the day; (4) the surface of the land should be as level and free from clods as possible."

A Fly enemy of Timothy Grass.

In the 'Transactions' of 1931 I gave a note, illustrated by a photograph of damage by the maggots of a fly to the flowering spikes of Timothy Grass. The spoiled specimens came from near Stirling. On dissection of these I found a single maggot which failed to pupate. From somewhat similar damage recorded from several European countries I suggested that the likely culprit was a fly named *Amaurosoma.* Through the kindness of Mr L. A. L. King of the West of Scotland College of Agriculture I have since learned that specimens of the fly have been sent to the Imperial Bureau of Entomology, and the enemy has been determined as *Amaurosoma armillatum.* As far as I know this is the first mention of this Timothy grass pest in Scotland, and I give some notes from the observations of Mr L. A. L. King and Miss Agnes A. Meikle.[1] Flies caught near Stirling laid eggs on Timothy in the laboratory. Eggs were also found, in the field, on June 1, 1932. The eggs are laid at the base of a leaf—one egg to a leaf—at a stage before the flowering head has emerged. In the laboratory, eggs hatched in four to five days and the legless larva gained entrance to the flower head between the edges of the folded leaves or by boring. The maggot ate round the flower head and then downwards, spoiling the flower-buds (Fig. 53). The full-fed maggot drops to the ground and enters the soil for protection.

The Carrot Fly as an Enemy of Celery.

The reception of a specimen of celery infested by the larvæ of the Carrot Fly (*Psila rosæ*) gives opportunity to answer a question asked every now and again, "Does the Carrot Fly attack celery?" The answer is yes, and there is nothing surprising about it as carrot and celery both belong to the same order of plants—viz., *Umbelliferæ.* Celery plants attacked by the maggots of *Psila rosæ*, the Carrot Fly, are weakened and may be quite destroyed. The larvæ are found boring into the bases of the celery leaf-stalks, in the crown of the plant, and the thicker roots. There can be a summer attack and an autumn attack.

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[1] "A fly pest of Timothy Grass," by L. A. L. King and Agnes A. Meikle, Department of Zoology, West of Scotland Agricultural College, published in 'Nature,' June 10, 1933.

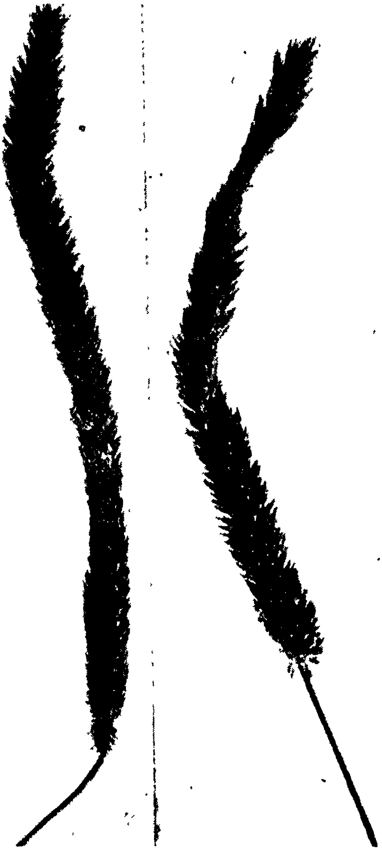

Fig. 53.—*Flowering spikes of Timothy Grass injured by larvæ of the fly* Amaurosoma armillatum.

OAK GALLS.

In September came oak leaves from Ayr affected, as the accompanying letter said, " with some species of disease."

One of the leaves sent as typical was covered with the Spangle Gall, one of the commonest of the large number of different kinds of gall found on the oak. The Spangle Gall is due to a gall-wasp of the family *Cynipidæ*, a family which belongs to the same insect order as bees, wasps, ants.

The gall-wasps are small insects, not noticed by the ordinary observer, and often far liker one another than the galls or swellings which result from their prickings or punctures. The larvæ which inhabit the galls are legless grubs. An interesting feature in the life-history of some *Cynipids*—and it is true of the Spangle Gall species—is the occurrence of an alternation of generations, one generation consisting of males and females reared in a gall of one form or pattern, while the alternating generation consists entirely of virgin females reared in a gall not only of different shape, but also—it may be—on a different part of the plant.

The Currant Gall (Neuroterus (Spathegaster) baccarum).
The Spangle Gall (Neuroterus lenticularis).

Fertilised females from a Currant Gall (Fig. 54) prick the under surface of oak leaves in June for the laying of their eggs. The gall which results appears first as a tiny projection on the underside of the oak leaf, and as it grows takes on a lens or button-like appearance; it is attached to the leaf by a minute stalk. The gall is yellow-green, but the colour is masked by a number of red-brown or red-yellow hairs. The rim of the gall is slightly turned up and there is a boss in the centre. These galls are full grown in September, when they measure $\frac{1}{6}$ inch across (Fig. 55). In autumn the galls fall away and lie among the litter below. The adult insects come from them in April, and they are all females. These virgin females lay eggs underneath the bud scales of oak, and as a result small globe-shaped galls, that look like currants, are produced on the leaves and the male inflorescences (Fig. 54). These Currant Galls grow quickly, and the larva inside also develops rapidly. Pupation takes place in the gall, and the adult gall wasps are ready to come away in June. From some ripe Currant Galls males come, and from others females come. Pairing takes place, resulting in the fertilised females with which we began the life-history.

THE LABURNUM LEAF-MINER.
Cemiostoma (*Leucoptera*) *laburnella*.

In the 'Transactions' of 1922 I gave a note on this beautiful little moth, concerning which a correspondent asks as to its life-history. The sender complained that the blotched leaves were spoiling the decorative appearance of a favourite laburnum.

The moth measures only ¼ inch in spread of wings; the front wings are white with a yellow line and spots; hind wings greyish; the wings have pale fringes.

In May the moths can be found resting, in the daytime,

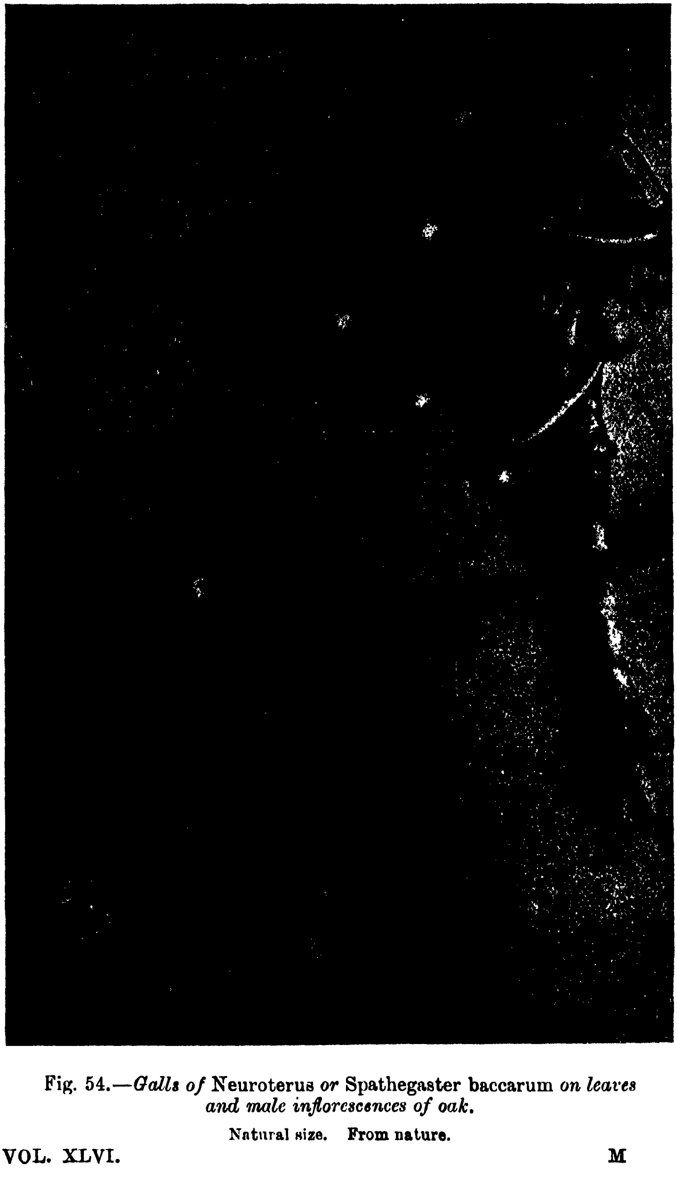

Fig. 54.—*Galls of* Neuroterus *or* Spathegaster baccarum *on leaves and male inflorescences of oak.*

Natural size. From nature.

on and near laburnum trees. The female lays her eggs on the underside of the leaflets, and the caterpillar on hatching enters the leaflet and mines out a small tunnel that leads to a discoloured green-grey blotch or patch. If such a leaflet be held up to the light a number of spiral rings may be seen—the work of the mining caterpillar.

The full-grown caterpillar measures ¼ inch in length; it is pale green in colour with grey head and brown jaws; the segmentation of the body is distinct and the legs number sixteen.

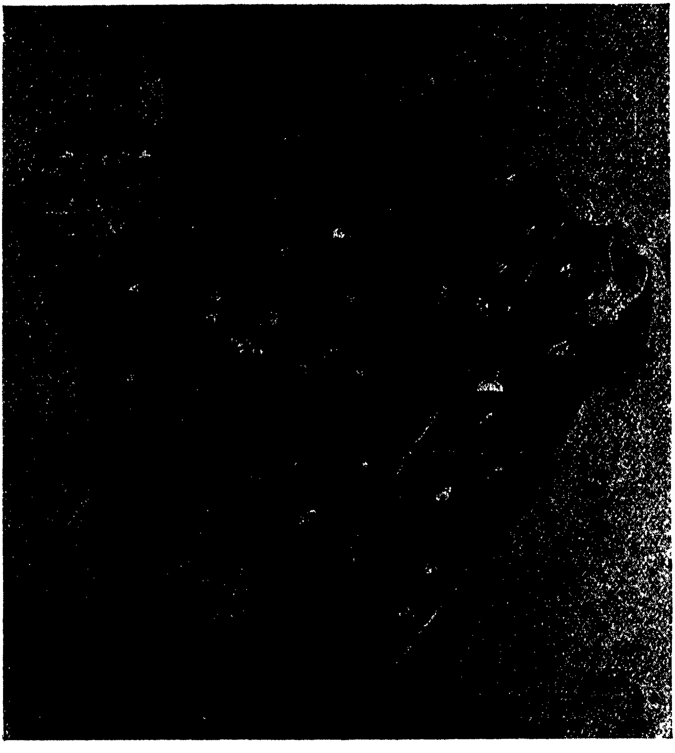

Fig. 55.—*Galls of* Neuroterus lenticularis *on leaf of oak.*
Natural size. From nature.

The full-fed caterpillar leaves the spoilt leaflet and turns to a pupa under cover of a white cocoon attached to the leaves. This pupal or cocoon stage is reached in July. In a fortnight from pupation a new brood of moths issues and from their eggs come caterpillars which are full grown in October. These caterpillars leave the blistered leaflets and let themselves down to stem or soil, and pupate. The moths from the autumn pupæ come away in the following May.

SPINNING MITES OR RED SPIDERS.

One of the families of Mites, the *Tetranychidæ*, contains several genera very destructive to fruit trees and fruit bushes, to trees and plants other than fruit plants, in the open, and also to plants under glass. One of the genera is *Bryobia*, characterised by the two front legs of the mite being not only longer than the body but distinctly longer than its other legs. The *Bryobia* mites spin only slightly as compared with some of the others mites, *e.g.*, *Tetranychus telarius*, often called the Red Spider, which covers the undersides of the leaves of infested plants with a dense webbing in which eggs and young and adult mites can be found.

A correspondent from Argyll sent specimens of a species found in numbers crawling on the windows. Examination showed these to be *Bryobia pretiosa.* In the spring of 1932 and again in 1933 multitudes of this mite had appeared on certain windows of the ground floor of a house; the windows, to which the mites came in quantities, had a southern and an eastern exposure. The mites swarmed on sunny days. My correspondent informed me that he had no dogs, cats or birds in the house, but *Bryobia* is vegetarian and the mites had spread from ivy or other plants in the garden. Fortunately they showed no desire to enter the house.

For control the windows had been sprayed twice a day with paraffin. Our correspondent was advised to try one of the proprietary extracts of pyrethrum, which he did, and it killed the mites, as the paraffin also did, but was dearer.

SHEEP MAGGOT FLIES.

Of recent years a great amount of research work has been done on the Blow-Flies of sheep, the species involved, the conditions under which sheep are 'struck,' the habits of the maggots, the multiplication of the flies, the trapping of flies by baits of flesh and carrion, the possibility of protection of the sheep against their being 'struck,' and the treatment of 'struck' sheep. This is a question in which many of our members are greatly interested, and I am anxious to bring to their notice a recent Report,[1] accessible to members and full of practical suggestion.

This Report describes work done in Australia where, during the past quarter of a century, the sheep maggot question has become a national problem due to the accidental introduction and spread of troublesome blow-fly species and the presence of a susceptible strain of sheep.

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[1] "The Sheep Blow-fly Problem in Australia." Report No. 1, by the Joint Blow-fly Committee. Council for Scientific and Industrial Research, Pamphlet No. 37. New South Wales Department of Agriculture, Scientific Bulletin No. 40, January 1933.

Our British blow-fly species are two green-bottle flies, *Lucilia sericata* and *Lucilia cæsar*, and two bluebottle flies, *Calliphora erythrocephala* and *Calliphora vomitoria*. In the 'Transactions' for 1904 and 1909 I stated, as a result of breeding experiments with maggots from sheep sent to me from practically every county in Scotland, that *Lucilia sericata* was the severest enemy in Scotland, although *Calliphora* did its share of damage. In Australia our *Lucilia sericata* along with another non-British species, *Lucilia cuprina*, are primary sheep enemies. These are associated with four species of *Calliphora*, while there are other so-called secondary but very harmful green-bottle flies. In Australia *L. sericata* and *L. cuprina* are known as primary flies because they initiate an attack and prepare the way for the secondary flies which follow up and take advantage of the conditions induced by the work of the primary maggots.

The biology and habits of the various flies are described in the Report, and there are interesting chapters on susceptibility, the influence of environment and the various kinds of 'strike' according to position on the body. In relation to control there is much information regarding spraying for prevention, the dressings for attacked sheep. and the chances of protection for some time from further strike.

Blow-flies marked and then liberated have been recovered at distances of four to ten miles from the place of liberation.

Male blow-flies can ripen their reproductive organs and proceed to an effective copulation on a diet of sugar and water or honey, but the female cannot ripen her ovaries and eggs unless some protein—*e.g.*, flesh or liver—is present in the diet.

While in nature an adult blow-fly might live a month, a female hybrid between the two green-bottles, *Lucilia sericata* and *Lucilia cuprina*, lived in laboratory conditions, with provided food, in Dr M. J. Mackerras' experiments at Canberra,[1] for ninety-four days and during her life laid 3171 eggs. Another *Lucilia sericata* female lived seventy-seven days and laid 2373 eggs.[2]

THE ROUNDWORMS AS PARASITES OF ANIMALS AND PLANTS.

During the year, on several occasions, complaint reached me as to worms present in the bronchi of certain farm animals setting up bronchitis and pneumonia. The nature of the parasite, and how stock become infected, as well as the life-history of the parasites, often seem puzzling to correspondents, and an attempt is made here to clear away difficulties.

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[1] "The Sheep Blow-fly Problem in Australia; and the Bulletin of Entomological Research," Vol. XXIV., September 1933.

[2] Laymen unaccustomed to this kind of experimental work have expressed surprise that such counts can be accurately kept; there is really no difficulty, for as food material—rabbit, other flesh, liver—is regularly provided and regularly removed, the collections of eggs on the removed food can be counted.

The great mob of worms may be conveniently divided into three classes, the roundworms, the flatworms—*e.g.*, liver-fluke and tapeworms—and the ringed-worms, where the ringing is not just a mere wrinkling of the outer skin but is associated with an internal segmentation—*e.g.*, the earthworm.

Apart from shape the roundworms and the tapeworms may be contrasted thus :—

Tapeworms.	*Roundworms.*
No mouth and no alimentary canal; the adult worms live in the alimentary tract of their host, absorbing food over their surface and through the skin.	Have a distinct mouth and alimentary tract which ends in an anus.
Development is indirect—*i.e.*, from the egg there hatches a young form quite unlike the parent.	Development is direct—*i.e.*, the young on hatching do not look unlike the parent but resemble the parent in form.
The sexes are not separate ; the sexual apparatus is developed to such an extent that each joint has a set of male and female reproductive organs. The ripe joints are just bags of eggs.	The sexes are separate, the worms being male or female (there are interesting exceptions).
Complete parasites that require two host animals of different species for the completion of their development : the host animals stand in relation to one another of eater and eaten—*e.g.*, in the case of sturdy or staggers in sheep, the young stage of the tapeworm in the brain of the sheep (intermediate host) can go no further until the diseased tissue is eaten by a dog (the final host) in whose alimentary tract the freed young forms become adult; ripe joints are shed which reach the pasture in the fæces and the eggs may be swallowed by a sheep. And so also with man and the pig, man and the ox, man and fish, cat and mouse, dog and rabbit, fish and oyster, bird and insect.	Many are parasites, but in most of the cases there is some necessary free stage in the open. Very often no intermediate host of a different species is necessary, but if there be a change of host this just means the passage from one animal to another of the same kind. Examples quoted later will make what can happen clearer.

NEMATODA.

The Nematodes or threadworms or roundworms have an elongated worm-like form, the body tapering to both ends or sometimes, as in the males of the Strongyle section of these parasites, having the genital opening at the hind end surrounded by a bell-shaped bursa [1] which is kept expanded by stiff ribs. The cylindrical body is covered with a smooth, thick, protective cuticle secreted by the underlying protoplasm (occasionally the body shows spines and lateral ridges). At the front end is a mouth ; the mouth in some species is provided with lips and sensory papillæ, in other species no lips are present ; there may be an armature of horny teeth that can wound, and sometimes a piercing spine or spear which can be thrust out of the mouth. The alimentary tract or canal is a straight tube, without folds or loops, running from mouth to posterior anus with regions distinguished as œsophagus or gullet, intestine, rectum. The muscular gullet may play the part of a suctorial pump drawing in the liquid food. In some forms the mouth leads into a specialised region, armed or unarmed, known as the buccal capsule.

The general body structure is simple. Below the skin are four longitudinal layers of muscle fibres, one above, one below, and one down each side. Urinary waste is got rid of by two tubes which begin blindly behind, and run forward, one along each side of the body ; they join in front, and empty their contents to the outside by a pore on the under surface ; the pore varies a little in position, but roughly it is a third or a quarter the length of the worm from the head. There can be a simple nervous system consisting of a nerve-ring round the gullet from which a few nerves run forwards and backwards. There is no special respiratory system and no special blood system.

The sexes are mostly separate and the males are smaller than the females. The male secretion passes by a pore at the hind end into the chamber that ends the alimentary canal, and thence to the outside. The eggs of the female leave the body by an opening about the middle of the body (there are exceptions).

Development is direct, that is to say, from the fertilised egg there hatches a young worm which more or less resembles the parent and which reaches the adult stage after feeding and a series of moults. It is important to notice, in connection with the parasitic roundworms of stock, that the egg when laid is not infective if swallowed at once, nor is the newly hatched young worm. At least two moults must take place before the worm has reached the stage that can set up infection. The infective stage can, however, in favourable environmental conditions, be reached in a comparatively short time.

Some roundworms are free-living, found in damp earth or decaying matter, or in water, but far the greatest number are parasites. A number are parasitic in man, while the farmer suffers great loss from others that are parasites not only in his farm animals, including poultry, but also on and in his plants.

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[1] Bursa means a sac or pouch.

Of late years research workers have directed attention to Nematodes that parasitise certain insects injurious to agricultural and forest crops,[1] and the technique of the future may result in parasitic worms playing their part in experimental biological control. In Britain[1] certain parasitic roundworms have been found killing the leather-jacket, and sterilising both the male and female of the frit-fly of oats, and the destructive Elm Bark Beetle.

LIFE-HISTORY OF SOME ROUNDWORMS PARASITIC ON FARM ANIMALS ILLUSTRATING VARIATIONS IN COMPLEXITY.

The Large White Worm of the Horse (*Parascaris equorum* or *Ascaris megalocephala*) (Fig. 56).—This is a parasite of the small intestine of the horse and related animals. The male measures ten inches in length and the female up to sixteen inches. Males and females reach the adult stage in the small intestine of the horse. Fertilised eggs are laid in great numbers. The eggs pass out in the excrement on to pasture or in stables, with a risk that they may reach the horse's food or drinking water. The tough shell renders the eggs very resistant to outside influences. By a fortnight the developing eggs can reach an infective stage, and if swallowed in food or drinking water hatch out in the small intestine. The young worms grow and become adult and a new generation is started.

This simple life cycle is what is found in several round worms, and was believed to represent what always happened in *Parascaris equorum*. Research, however, has proved that the life cycle is more complex, and that, as happens in *Ascaris lumbricoides* (see below), the *P. equorum* young worms migrate from the intestines to other organs and then return to the intestine. *P. equorum* is not a blood-sucker.

Ascaris lumbricoides.—This Ascarid of man and the pig is parasitic as adult in the small intestine. The male can measure up to ten inches and over and the female to fourteen inches. Like the preceding species this worm has three lips

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[1] "A Mermithid parasite of *Tipula paludosa*," by J. Rennie, in Proc. Roy. Phy. Soc., Edinburgh, XXI., Pt. 1.

"On a remarkable new Nematode parasitic on the Frit-Fly," by T. Goodey, in 'Phil. Trans.,' Series B., CCXVIII.

"On the infestation of Elm Bark Beetles (*Scolytus*) by a Nematode," by J. N. Oldham, in the 'Journal of Helminthology,' Vol. VIII., Pt. 4.

"Helminths in the Biological Control of Insect Pests," by J. N. Oldham, in "Notes and Memoranda," No. 9, 1933, of Imperial Bureau of Agricultural Parasitology.

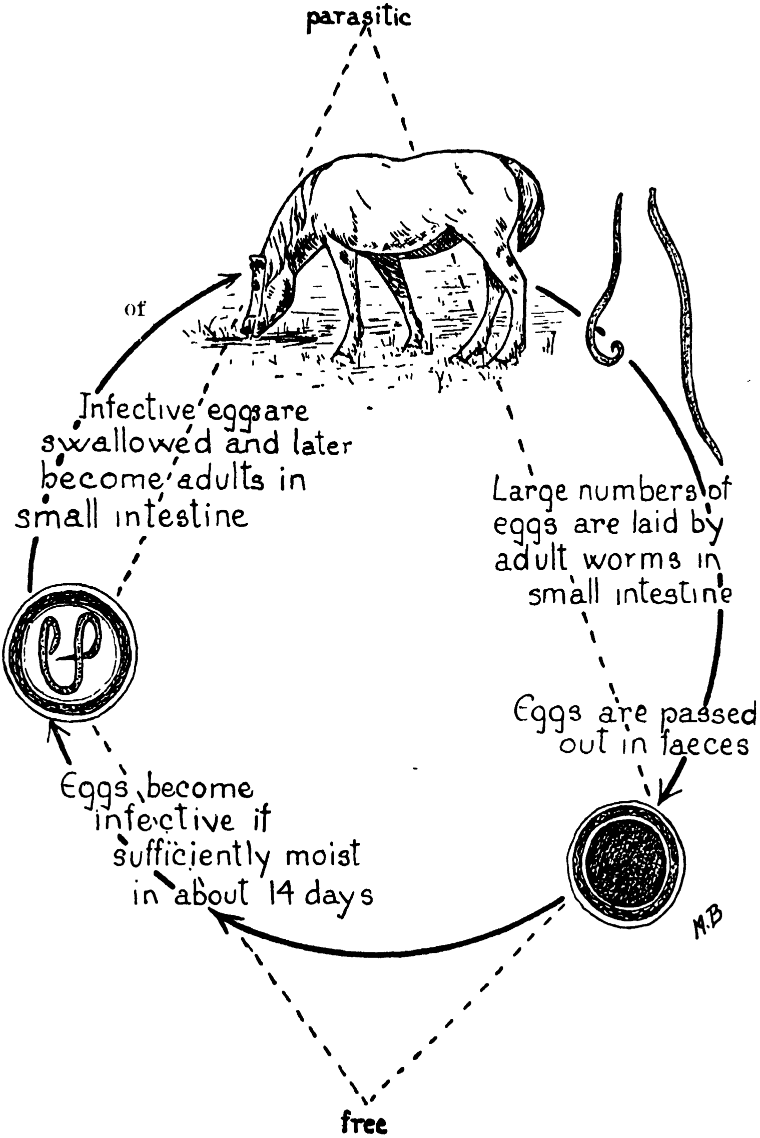
parasitic
of
Infective eggs are swallowed and later become adults in small intestine
Large numbers of eggs are laid by adult worms in small intestine
Eggs are passed out in faeces
Eggs become infective if sufficiently moist in about 14 days
M.B
free

Fig. 56.—*Life-cycle of the Large White Worm* (Parascaris equorum).

By the courtesy of Captain A. W. Noel Pillers and the Veterinary Record in which the Figure appeared on 11th November 1933 as illustrating an address by Captain A. W. Noel Pillers on Helminths of Economic Importance of Farm Animals, including Poultry.

The Figure is used here as an example of a simple and easily followed Roundworm life-history, although we now know that the *Parascaris equorum* life-cycle is complicated by the wandering of the young worms to various internal organs.

round the mouth, one above and two latero-ventral lips, and as in the horse worm, the tail of the male is permanently curved. The muscular gullet has a sucking action. The adult worms in the small intestine of the host animal pair and the female lays a large number of fertilised eggs. For development the eggs pass to the outside in the fæces. By accident or by wind, or carried by house-flies, the eggs may reach food or drinking water. The eggs take from a fortnight to over a month and longer, according to conditions favourable or otherwise, to become infective, and then, if swallowed by a host of the same kind of animal, these eggs hatch in the small intestine, the egg-shell being dissolved by the digestive juices. The tiny worms burrow through the wall of the small intestine, and, reaching the portal blood system, are carried to the liver, thence to the heart and lungs. The young worms, which have been growing and moulting, break through the capillaries and do harm in the air passages. (Some authorities think that the young worms reach the lungs by piercing the intestinal wall and by way of the diaphragm enter the lungs from their outer surface.) Leaving the bronchi and passing up the windpipe the worms, now over $\frac{1}{25}$ inch in length, reach the back of the mouth, pass down the gullet and come again to the small intestine, where they become adult.

Not only then does *A. lumbricoides* cause intestinal troubles by its presence in numbers in its well-grown stages, but the lesions in liver and lungs due to the migrating young worms are often serious. Like the horse species, *Ascaris lumbricoides* is not a blood-sucker.

While some would make two species of *A. lumbricoides*—viz., the form infesting man (especially children) and the form infesting pigs—the two so resemble one another in size and form that most authorities consider them the same species. But as experimentally it has not been possible to show that the young worms from the pig can become mature in man or that the young forms from man can mature in the pig, we speak of two *biological races* of the species. The significance of biological races will appear later when we deal with the roundworm enemies of plants.

Hæmonchus contortus.—This red, thread-like worm found in the fourth or true digestive stomach of the sheep may be taken as an example of a life-history where the eggs that are passed to the outside in the fæces hatch in the open and the young worms develop to the infective stage, when if swallowed they can go on to maturity.

The male measures just over ½ inch in length ; the female reaches 1¼ inch. The reddish colour is due to sucked blood, and the sheep suffers not only from loss of blood but also from the worm's toxic secretions and from interference with digestion.

H. contortus is as a rule associated with more numerous smaller species; the resulting loss can be great, especially in lambs. The worms pair in the fourth stomach where many eggs may be laid. The eggs leave the sheep in the droppings and hatch in the open. If the fallen-away eggs or the newly hatched young worms be picked up and swallowed by another sheep nothing happens, for the parasite must pass through two stages and reach a third stage after two moults before it can be infective and attain to the adult condition on being swallowed. No set time can be stated for *contortus* to reach the infective stage; it can be from a week in warm weather to much longer according to the conditions. In its third stage *H. contortus* shows considerable activity in the pasture or field, ascending blades of grass wet with dew or rain, so reaching a favourable position for being swallowed by the sheep. Taken up by the sheep in its third or infective stage the parasite completes this stage in the fourth stomach, moults again and in its fourth stage reaches maturity. Mating and egg-laying follow.

"The time which elapses between the swallowing of the infective larval worm by the sheep and the appearance of eggs of the mature worm in the sheep's droppings is three weeks."[1] This time for development is greatly exceeded in unfavourable conditions to which the young worms in the soil are resistant; the moulted skins of the 1st and 2nd stage young worms are retained as a protective sheath until the worms are swallowed, when the sheath is digested and the worm attaches itself to the mucous membrane of the stomach. On a pasture the risk of infection from resistant third stage larval worms may extend to as long as a year.

Before dealing with the roundworms that are parasitic in the respiratory organs a last example may be given illustrating how there can be with some roundworms a change of host animal, without a stage in the open air.

I choose the worm which causes Trichinosis not because it is common in Britain but because it can be parasitic in man, as well as in the pig and the rat, and because it can pass from pig or rat to man.

Trichinella spiralis lives as adult in the small intestine and in the larval or young condition in the voluntary muscles of the same host species or another species. The male measures about $\frac{1}{20}$ inch in length and the female up to $\frac{1}{6}$ inch. Pairing takes place in the small intestine of the host. The fertilised female penetrating the mucous membrane of the intestinal wall produces great numbers of embryos which invade lymphatics and blood-vessels and are carried all over the body, coming to rest in the voluntary muscles. Favourite places are the muscles of the tongue, throat, diaphragm. The young worms penetrate the elastic muscular sheath of the fibres and become surrounded by a cyst of connective tissue formed by the host. In the cyst or capsule the young worm lies, coiled in a spiral. The worm has reached the infective stage, but can go no further until the flesh containing it is eaten by a suitable host. If eaten by such a host the capsule of connective tissue is digested and the young Trichina is set free and becomes adult in the intestine. Trichinised rat flesh can infect another rat. If trichinised rat flesh be eaten by a pig the pig can become trichinised. Trichinised pork, raw or insufficiently cooked, can infect man.

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[1] "Stomach worms in Sheep," Bulletin No. 1: "Some diseases of farm animals." Ministry of Agriculture and Fisheries, page 99.

THE ROUNDWORMS OF THE RESPIRATORY ORGANS.

The ailment known as Husk or Hoose in lambs, calves and pigs is familiar enough to farmers, although they are not always clear as to the cause, and in view of requests for information during the year a general account is given of the roundworm parasites whose presence in the bronchioles and bronchi and lung tissue is the cause of the wheezing, the cough, and bronchitis and pneumonia.

We shall describe in turn the Lungworms [1] of sheep, cattle and the pig. We shall find that some of these worms in order to complete their life-cycle require the presence of an intermediate host of totally different relationship from the domesticated animal which acts as the final host of the parasite.

The Lungworms belong to a large and important section of the roundworms, the males of which are characterised by the possession at the tail end of a more or less bell-shaped extension of the cuticle of the worm; this extension known as the bursa is strengthened by a series of ribs differing in number in different worms; the microscope is necessary for distinction.

LUNGWORMS OF SHEEP.

Dictyocaulus (*Strongylus*) *filaria*.—This worm is white and thread-like; male 1 to 3 inches long, female 2 to 4 inches.

This worm, a widely distributed species, is found in the smaller bronchi and just inside the larger bronchi; it is the cause of husk, of verminous bronchitis that may lead to pneumonia. According to the number of the parasites and the age and condition of the sheep the following symptoms are noticeable: a husky cough that may become very frequent; distress in breathing, from the air passages being plugged with worms and mucus; and ultimately complete prostration.

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[1] The student and stock owner should, for a thorough discussion on Lung Worms, consult the following papers:—

"The Bursate Lungworms of Domesticated Animals," by T. W. M. Cameron, M.A., D.Sc., M.R.C.V.S., Research Professor of Parasitology, M'Gill University, in the 'Imperial Bureau of Agricultural Parasitology Journal' for 1933.

"Helminths of Economic Importance in Farm Animals," by Captain A. W. Noel Pillers, F.R.C.V.S., D.V.S.M., F.R.S.E., in the 'Veterinary Record' for November 11, 1933.

"The War on Live Stock Parasites," by Maurice C. Hall, Chief, Zoological Division, Bureau of Animal Industry, U.S. Department of Agriculture, Washington, in the 'Cornell Veterinarian,' October 1932.

The worms pair in the air passages of the lungs, and the fertilised eggs undergo segmentation and development while still in the body of the female, so that when laid, embryo worms are ready to hatch. The coughed-up mucus may contain worms and eggs; or the eggs having hatched, the tiny worms reaching the gullet are swallowed and pass to the outside in the fæces. Two moults take place. Up to this time the worms have not been able to infect the sheep, but with the second moult completed, the worms reach the third or infective stage, and if taken up by sheep in food or water pass on to the intestine. "The larva," Cameron says, "penetrates into the lymphatics of the gut, especially the colon, and invades the mesenteric lymphatic glands. About the fourth or fifth day after infection the young worm moults again; these worms, measuring now about $\frac{1}{25}$ inch, pass to the lungs about ten days after infection and cause small hæmorrhages as they enter the smaller bronchioles." In the bronchioles the worms become adult.

In favouring conditions of temperature and moisture the infective stage can be attained in a week. The third stage worm is resistant to severe external conditions and can retain its vitality and power of infection for some months. The third stage worm on the pasture is active in favouring conditions of temperature and moisture. Sheltering in the soil in dry or sunny weather, this third stage worm leaves the soil in dull, warm, humid weather, and passes on to grasses to be taken up by the grazing sheep; it wanders in due course to the bronchi and lungs, becomes adult, and a new generation is started.

Control.—In the case of worms that are parasitic in the alimentary tract, it is clear that drugs must have some chance of success as they can be brought directly into contact with the parasite, but this advantage is absent with our lungworms, which are more or less inaccessible to such direct treatment. Over a dozen drugs have been tried against the worms in the bronchioles and some have been used as injections into the tracheal tissue. Some of these are volatile and the purpose is that the vapour will reach and destroy the parasite. No great success can be chronicled by these methods, nor by inter-venous injections, which are meant to be carried in the blood-stream to the lungs and reach the parasites during excretion by the lungs. All such treatment is the work of the Veterinary Surgeon, especially because some of the drugs are dangerous and may have different effects on different animals—*e.g.*, carbon tetrachloride as liquid may be tolerated by the sheep but is dangerous for cattle. Maurice Hall forecasts a day when the technique will be so improved as to make the application of gas efficient against these worms.

All the authorities agree on the wisdom and efficiency of a good hygiene as preventing infection—clean pens, troughs unsoiled by fæces that may contain the parasite in infective stage, clean food, uncontaminated water.

The foregoing notes on the life-history of the parasite will have made it clear that with animals affected, overcrowding of stock must mean more and more infection of the pasture. It has been pointed out that the third stage young lungworm of the sheep is found on grass wet with rain or dew. If the pasture or feeding ground be eaten bare then risk of infection is also very great, for the young worms collect at the bases of the plants.

Where it is possible to spread the sheep's droppings so as to expose them to the drying influence of the sun, the worms present are destroyed.

A change of rotation, if practicable, would starve out the parasites. To change a rotation can easily present difficulties, but where land has become badly infected owing to the continued presence of stock, or from the too frequent feeding of animals harbouring roundworms and passing them in the fæces, it should always be a consideration in any plan of campaign against such parasites, how the farmer might find it possible so to vary his farm practice as to put the worms at a disadvantage.

There are two other parasites of the respiratory system of sheep belonging to a closely related family of roundworms. They are *Protostrongylus* (*Synthetocaulus*) *rufescens* and *Muellerius capillaris.*

Muellerius capillaris is a reddish worm measuring in the male up to an inch and in the female over an inch. The worms are parasitic in the bronchioles and the air spaces of the lung; they also enter the lung tissue, giving rise to small thickenings or swellings or nodules. The genital opening of the female is at the hind end just in front of the anus. The females lay their fertilised eggs in the lungs before the eggs have undergone segmentation. The embryo develops, the eggs hatch and the embryo worms reach the outside. Two German workers—the Hobmaiers—have proved that an intermediate host is necessary for this worm's further development; the Hobmaier experiments have been confirmed by other workers. The intermediate host is a snail.

A number of different snails and slugs may act as intermediate host, including our very common and very destructive grey slug (*Agrolimax agrestis*). The slug or snail swallows the minute worm, which reaches the mollusc's foot[1] or the worm may enter the foot directly. Here the worms develop until they reach the infective stage. Slugs or snails harbouring the infective stage of the worm are swallowed by the sheep with the grass on which the sheep is feeding. The young worms are freed and reach the lungs, and develop to the adult condition in the lungs as described above for *D. filaria.*

The other species, *Protostrongylus rufescens*, is a red worm which attains a rather larger size than *capillaris.* The female opening lies just in front of the anus. This worm is also parasitic in the bronchioles and connective tissue of the lung, and for its complete development an intermediate host—again a snail or slug—is necessary.

LUNGWORM OF CATTLE.

Dictyocaulus viviparus (*Strongylus micrurus*).—This worm, parasitic in cattle and deer and the cause of husk or hoose in these, has a wide distribution.

It is a white, thread-like worm measuring up to 1½ inch in the male and from 2½ to 3 inches in the female. Like *D. filaria* the worms are adult in the small bronchi and air passages, where they interfere with respiration. In badly infested calves the respiration is rapid and strained, the head is extended, the tongue protruded and the animal shows distress and signs of suffocation.

The life-cycle resembles that described for *D. filaria* of the sheep. The eggs are laid in the bronchioles with the embryo worms ready to hatch. These young forms pass to the trachea, from which they may be expelled in the coughing, or they may be swallowed and reach the outside in the excrement. The other details are as given for the sheep.

THE LUNGWORMS OF THE PIG.

Two species have been described—viz., *Metastrongylus elongatus* and *Metastrongylus brevivaginatus.* The latter species was distinguished by Railliet and Henry in France, and Cameron states that as a rule the two worms are found associated.

Metastrongylus elongatus is known in the literature under several names—viz., *Strongylus paradoxus*, *Metastrongylus paradoxus* and *Metastrongylus apri.*

Metastrongylus elongatus.—This is a slender worm found in many parts of the world; it is white or brownish. The male measures up to ¾ inch and the female from less than an inch to nearly 2 inches. The mouth is small and is surrounded by 6 lips; the tail of the female ends in a hard projection and the genital opening is just in front of the terminal anus. The worms are adult in the smaller bronchi and may appear in the windpipe. A cough is the accompaniment of the bronchitis induced by the parasites, these signs of infestation being indicated mostly by young pigs. Heavy infestation induces severe inflammation and pneumonia and death may follow.

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[1] The foot of a snail or slug is the muscular structure on which it crawls.

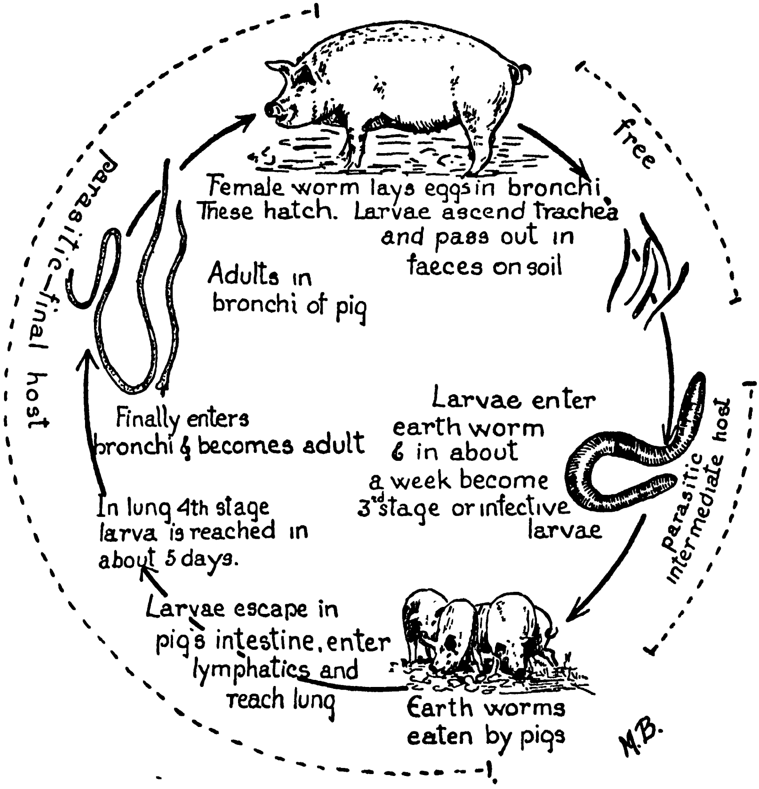
parasitic—final host
free
parasitic intermediate host
Female worm lays eggs in bronchi. These hatch. Larvae ascend trachea and pass out in faeces on soil
Adults in bronchi of pig
Larvae enter earth worm & in about a week become 3rd stage or infective larvae
Finally enters bronchi & becomes adult
In lung 4th stage larva is reached in about 5 days.
Larvae escape in pig's intestine, enter lymphatics and reach lung
Earth worms eaten by pigs
M.B.

Fig. 57.—*Life-cycle of* Metastrongylus elongatus *of the bronchi of the Pig.*

By the courtesy of Captain A. W. Noel Pillers and the Veterinary Record in which the Figure appeared on 11th November 1933 as illustrating an address by Captain A. W. Noel Pillers on Helminths of Economic Importance of Farm Animals, including Poultry.

Life-History (Fig. 57).—This parasite requires two host animals of different kinds for the completion of its life-history —viz., an earthworm, which acts as intermediate host in which the early stages of the worm are passed; and the pig or final host which receives the infective stage that goes on to attain the adult condition in the pig's bronchi.

The eggs laid in the smaller bronchi hatch at once, and the issuing young worms reach the open air either in the exudate discharged from the mouth and nostrils of the pig or the newly hatched worms may reach the back of the pig's mouth by way of the windpipe and be swallowed, to then pass out in the fæces. The tiny forms are swallowed by an earthworm, and in the body of the earthworm undergo two moults, and attain the third or infective stage. The pig becomes infected when it eats such an earthworm.

A number of different species of earthworm—some of them fæces-infesting species, others soil-inhabiting species—can play the part of intermediate host. The parasitised earthworms do not suffer from the presence of the young *Metastrongylus.*

When the third stage parasite has arrived in the alimentary canal of the pig, its further development and passage to the lungs of the pig resemble what has been detailed for the lungworm of the sheep.

If it were possible to rear young pigs on concrete floors, where earthworms would be absent, the disease would be effectively controlled.

ROUNDWORMS PARASITIC ON PLANTS.

These worms belong to the Family *Anguillulinidæ*, popularly known as Eelworms from their shape and wriggling and swimming movements as seen when examined in a drop of water under the microscope or in the soft tissues of a plant. These small worms have only been studied intensively in late years, and the work is full of encouragement. A number of excellent papers have been written—the experimental work stimulated by the proved economic importance of eelworms—and there has just been published a most helpful and valuable book [1] by Dr Goodey, one of the world's authorities on eelworms. The volume, for its thoroughness, its clearness of statement and excellence of illustrative figures, can be cordially recommended to farmers, gardeners and all students of the subject.

Eelworms are small, round worms found all over the world; some in water; some living a free life in the soil or in heaps of decaying organic matter; and others as external and internal parasites of plants.

Earlier in this Report I have given a general description of the structure of a typical Roundworm, and as regards the eelworms to be described here, it need only be added that the small mouth leads into a gullet in the middle region of which is a muscular swelling or bulb; and that a mouth spine or spear or stylet is present which can be thrust out and withdrawn; this structure enables the parasitic species to pierce plant tissues. Eelworms typically have an elongated worm-like form, but the mature females of the genus *Heterodera* [1] are rounded or sac-like or pear-like.

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[1] 'Plant Parasitic Nematodes and the diseases they caused,' by T. Goodey, D.Sc., with a Preface by R. T. Leiper, M.D. D.Sc., F.R.S. (Methuen & Co.)

THE GENUS ANGUILLULINA (TYLENCHUS.)

The *Anguillulina* eelworms have a worm-like elongate form; the males have a bursa, or at least wing-like (on magnification) outgrowths of the cuticle, at the tapering tail end; the female opening is on the underside in the middle region of the body or behind the middle.

Anguillulina tritici (*Tylenchus tritici* or *Tylenchus scandens*).—This is one of the gall-causing eelworms, the cause of the so-called ear-cockles or pepper-corns or purples in the flower-heads of wheat. This disease is characterised by the appearance at harvest time, in the ears, of hard, dark-coloured bodies shorter but thicker than grains of wheat. Fig. 58 shows these galls or swellings in the ear. These galls are sometimes confused with ergot-grains (*sclerotia*) due to a fungus—hence one name for the disease, False Ergot—but the galls are much shorter and completely different in structure. A true ergot sclerotium is spur-like and made up of compacted fungus mycelium, whereas the eelworm galls are swellings crowded with minute worms in various stages of development.

The common name Ear-Cockle is from the suggested resemblance of the worm galls to the seeds of corn-cockle, a weed of the chickweed and spurrey Order.

Bunt of Wheat is also sometimes confused with the worm galls, but it is due to a fungus—the diseased dark-coloured grains containing masses of fungus spores.

A. tritici (Fig. 59) is a very small worm, the adult male being at most $\frac{1}{12}$ inch and the adult female at most $\frac{1}{5}$ inch in length; the female, when resting, has her body coiled like a watch-spring. The life-histories of the roundworms of stock will have made the reader familiar with the fact that a roundworm attains adult condition after moults. We have the same happening in the eelworms, but the stages are less definite.

Life-history.—Worms—seven or eight of each sex—become adult males or females in the gall. Mating takes place in the gall.

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[1] One of the student's difficulties concerning eelworms is the confusion of names. In this Report I have used Goodey's names, adding the other names (in a bracket) where this seemed to make for clearness.

Hundreds of eggs—microscopic in size—are laid and the parents die. The egg hatches into a first stage larva, and after a moult we get the second stage larvæ and these remain in the gall (Fig. 60). When wheat is sown, if there be worm galls in the sample, these when they reach the soil are softened by the moisture, the wall breaks down and the second stage larval worms escape. These second stage worms pass to the baby wheat plants when these are at their youngest and remain feeding about the growing point of the stem ; they are carried up as the stem grows, ready to invade the embryonic flower-parts. The result of their irritating presence is the formation of the galls, under cover of which the second stage larvæ develop into the adults. The various parts of the flower may be galled. The young second stage larval worms in the galls have great vitality. Goodey and Byars found by keeping galls dry over

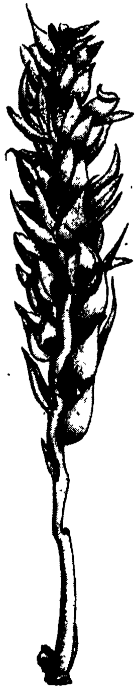

Fig. 58.—*Ear of wheat showing the dark-coloured galls due to* Anguillulina tritici.

From nature.

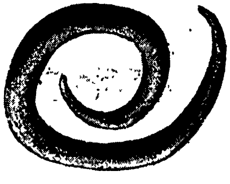

Fig. 59.—Anguillulina tritici.

Greatly magnified.

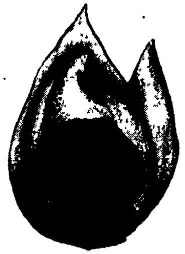

Fig. 60.—*Floret from ear of wheat showing gall.*

Magnified.

a period of years and then periodically soaking some, that the enclosed worms retained vitality and showed movement up to ten years.

Control.—The best control is, do not sow seed containing the galls. Where a sample of seed containing the galls is placed in a 20 per cent solution of brine, well stirred, the galls float to the surface and can be removed. The clean seed is then dried and sown. Galls eaten by animals are destroyed.

Rye is a susceptible host plant.

We need information as to the distribution of the ear-cockle worm in Scotland.

The Stem Eelworm, *Anguillulina dipsaci* (the name *dipsaci* is from *Dipsacus*, the teasle, in whose flower-heads the worm was first found in 1858). The worm is also met with in the books under the names of *Tylenchus devastatrix* and *Auguillulina devastatrix* (the name *devastatrix* was given because the worm was found to attack a large number of different plants).

This Stem Eelworm has been taken from nearly 150 different plants widely separated in relationship—*e.g.*, from some cereals (barley seems immune) and ryegrass, narcissus and hyacinth and onion, nettle and mangold and rhubarb, clovers and beans, potato, dandelion and plantain.

Biological Races.—The fact that such a large number of different plants can act as the host of *A. dipsaci* has led to much experiment, with the result that we know that there are ***strains*** or ***races*** of this worm which will attack a large number of plants, other ***races*** which will attack a smaller number, and still others so specialised that only two different plants are susceptible to attack. The importance of this in agriculture is manifest, for if the ***race*** or ***strain*** attacking is a non-specialised strain which can parasitise a number of different plants, then there may be great difficulty in arranging a rotation to dodge the enemy. Goodey writes[1] regarding *A. dipsaci:* "For the most part, the biologic races of the species affecting agricultural crops are of the specialised type and the risk of transference to other crops is very considerably lessened. For example, after tulip-root in oats, red clover or potatoes might be grown without risk of injury. After stem disease in red clover, oats potatoes or wheat might be successfully grown, but it would be extremely risky to sow kidney vetch, or any other kind of red clover and also alsike clover, though white clover, sainfoin, lucerne or trefoil might be grown. In the case of disease in onions, almost any kind of suitable crop might be grown with impunity, but it would be unsafe to put down narcissus bulbs since these are susceptible to the onion strain or race and vice-versa." One may not write more fully on the subject here, but for anyone who cares to follow up this subject I give, below, references to some papers that can be consulted without difficulty.[1]

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[1] 'Plant Parasitic Nematodes' (Methuen), page 290.

A. dipsaci is a very slender worm with both ends pointed, the hind end specially so; the average length is $\frac{1}{25}$ inch. Pairing takes place in the infested tissue and from the microscopic eggs wormlets can hatch in a week. Growth and moulting take place and an active stage is reached immediately prior to the attainment of sexual maturity. In this active stage migration movement takes place in the softer tissues of the plant, and into the soil and from one plant to another.

All stages, egg, young worms and adults may be met with in the infested plant and in high numbers.

These eelworms are resistant to unfavourable external conditions: Rostrup took the worms in the infective stage preceding the adult condition from clover-hay four years harvested; Wilson took them from dried Phlox material after five years; and Goodey from Narcissus bulbs that had been kept dry in a corked tube for over six years, and in all three experiments the eelworms revived on the addition of moisture.

A. dipsaci on Oats.—The disease is known as Segging. Robertson [2] has pointed out that segging in this use of the word means Sedging, from the sedge-like appearance and tufted condition of attacked oat plants. Much has been written on this eelworm of oats both on the Continent—Holland especially—and at home in past time by Whitehead, Ormerod and Theobald, and more recently in Scotland by Robertson.[3] The seedling oat can be invaded by the eelworm at a very early stage, when a single leaf is showing, and later examination of attacked plants may reveal large numbers of the parasites, many collected at the base of the plant.

The stem is invaded by the worms and according to the stage of the plant and the number of invading worms the infested plants show varying signs of attack: a dying away of very young plants; an active and abnormal tillering, the tillers at the base of the swollen stems being twisted and curved into tortured shapes; in 1897 Miss Ormerod wrote: "The leaves are sometimes widened and much waved along the edges so as to resemble those of a sedge; sometimes they more resemble a number of upright grass leaves and the colour of the infested plants is sometimes of a remarkably deep green" (the name Tulip-Root for the disease is due to the swollen base of the plant with its twisted tillers and the tuft-like standing-up leaves); the root system is shrunken and the roots may disappear; the ease with which the plant can be pulled away from such roots as remain; plants that are not overwhelmed remain stunted so that an observer notices two types of plant, the stunted, attacked plants and the taller, healthy plants.

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[1] "The difficulties of growing Red Clover," by A. Amos in 'Journ. Roy. Agric. Soc.,' lxxix., 1919.

"On the susceptibility of Clover and some other Legumes to Stem Diseases caused by the Eelworm, *Tylenchus dipsaci*." 'Journ. Agric. Science,' xii., 1922.

"A disease of Wild White Clover caused by the Eelworm, *Tylenchus dipsaci*." 'Annals of Applied Biology,' xii., 1925.

"Observations on the Biology of *Tylenchus dipsaci* and on the occurrence of biological strains of the Nematode," by W. E. H. Hodson in 'Annals of Applied Biology,' xiii., 1926.

"Further investigation on the Eelworm Disease of Phloxes," by G. F. Wilson in 'Journ. Roy. Hort. Soc.,' 1930.

"The Stem and Bulb Eelworm, *Tylenchus dipsaci*, and on the occurrence of biological strains of the Nematode," by W. E. H. Hodson in 'Ann. Applied Biol.,' xviii., 1931.

"Biological Races in Nematodes and their significance in Evolution," by T. Goodey in 'Ann. Applied Biol.,' xviii., 1931.

[2] "Oat sick land in relation to Eelworm disease," by David Robertson, B.Sc., N.D.A., Ph.D., in 'The Scottish Journal of Agriculture,' January 1929.

[3] "Observations of the Disease on Oats caused by the Stem Eelworm, *A. dipsaci*," in 'Annals of Applied Biology,' xv., part 3, 1928.

With persisting weakened plants the inflorescence may not escape from the ensheathing leaves, and eelworms reaching the flowers may remain protected between the glumes and the pales, and the pales and the stunted grain, with the later possibility of spreading infection. The spread of eelworms in seed has great practical importance.

Control.—This is very difficult. The stem eelworms are found in the surface layers of the soil. Deep ploughing to a depth of eighteen inches is a recommended measure. Testimony is unanimous as to the advantage of top dressings of sulphate of potash, 3 cwt. per acre, or sulphate of ammonia, 1 cwt. per acre. These dressings assist the plant. Observers are often surprised at the reasonable crop that is secured at last when early examination had revealed bad eelworm infestation.

Space does not permit of consideration of the bulb-infesting eelworms—*e.g.*, the Bulb Disease of Narcissus due to *A. dipsaci*, but as a note has been given on the resistant powers of eelworms, especially the egg and non-mature stages, it may be mentioned that heat at comparatively low temperatures is fatal to this eelworm in all its stages. One of the methods of control of *A. dipsaci* as an enemy of Narcissus is to immerse the bulbs—placed for the purpose in receptacles with a wide mesh—for three hours in water kept at a temperature of 110° F. The parasites are killed, the bulbs are carefully cooled and then dried and planted.

One form of Clover Sickness and also the disease known as Worm-Root in potatoes are due to *Anguillulina dipsaci*.

THE GENUS HETERODERA.

The *Heterodera* eelworms differ in appearance in the two sexes, for while the males have an elongate worm-like form the females are swollen and sac-like or pear-shaped; the tail end of the male is rounded and there is no definite bursa, only a slight expansion of the cuticle at the sides; the female genital opening is near or at the tail end.

The Root-Knot Roundworm, *Heterodera marioni* (much more widely known as *Heterodera radicicola*).—The worm is parasitic inside the roots of plants; galls arise as the result of attack. Goodey quotes a list of 600 host plants for this species, and the list is not complete. No specialisation is known, the worm from any one host being able to pass to a different host species. The male measures about $\frac{1}{25}$ inch and the female, whose body is pear-like with a neck, less. The root is invaded by the newly hatched worms and after some moults the adult stage is attained. The ripe female does not retain her eggs, but these—in great numbers—are put to the outside in a gelatinous sac which remains attached to the swollen body of the female. In Britain this parasite is more an enemy of plants under glass, where it is successfully fought by sterilisation of the soil by heat, and also by chemicals.

Heterodera schachtii.—This important species, first described from the roots of beet in Germany in 1859, has been intensively studied since on the Continent, in Britain and in America, and a mass of literature exists concerning it. Goodey lists sixty-five different references. This parasite attacks a large number of host plants—cultivated plants and weed plants—of different Natural Orders. As with *A. dipsaci* we find in *H. schachtii* distinct biological or physiological races.

This eelworm is a major pest on beet on the Continent, where also certain cereals (oats chiefly) suffer, also leguminous plants —*e.g.*, peas. In Britain *H. schachtii* has attracted attention as an enemy on the roots of potatoes. I would draw attention to Research Bulletin No. 2 of the West of Scotland Agricultural College, by D. G. O'Brien and E. G. Prentice.[1] The Bulletin, which is finely illustrated, describes *H. schachtii* as an enemy of potatoes in the West of Scotland.

Life-history.—The female with body globe-shaped or lemon-shaped, and swollen with eggs, protrudes from the broken-through cortex of a spoiled root. The fertilised eggs hatch and the issuing wormlets, nourished at first on the yolk of the egg and the remains of the broken-down organs of the mother, invade the roots of a host plant where they feed and grow and moult. Up to a certain stage of development there is no difference in the shape of the young worms, but now the males with flask-like body lie passive, while their reproductive organs develop; this completed, the now worm-like males leave the tissue of the attacked root and escape into the soil for pairing purposes. The females, on the other hand, begin to swell till their body becomes rounded or lemon-shaped and protrudes into the surrounding soil. Mating takes place. After fertilisation the internal organs of the female begin to disintegrate and her body becomes merely a brownish sac under cover of which the young hatch and receive protection till they leave to invade other roots.

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[1] Reprinted also in 'The Scottish Journal of Agriculture,' Vol. xiii., October 1930.

The student should also consult the series of papers by Miss M. J. Triffitt in the 'Journal of Helminthology,' Volumes vii., viii., and ix. Also "Problem of Potato Sickness," by A. S. Buckhurst and J. C. F. Fryer in 'Ann. App. Biol.,' xviii., 1931.

"Investigations on Eelworm in potatoes in South Lincolnshire," by D. O. Morgan in 'Journ. of Helm.,' Vol. iii.

"Field Studies on *H. schachtii* in relation to the pathological conditions known as potato sickness," by Herbert W. Miles in 'Journ. of Hort.,' Vol. viii., 1930.

THE EFFECT OF TREATMENT ON THE COMPOSITION OF GRASS.

RESULTS FROM THE CRAIBSTONE DRAIN GAUGES.

By Professor JAMES HENDRICK, B.Sc., F.I.C., University of Aberdeen, and HUGH DOUGLAS WELSH, Macaulay Institute for Soil Research.

The most important crop in Britain is grass. Even in arable areas more than half the land is under grass, either permanent or rotation. In Scotland as a whole there are over 4,600,000 acres of land classed in the Agricultural Returns as under crops and grass. Of this, about 3,100,000 acres are classed as grass, of which 1,576,000 acres are called permanent grass. In addition, there is much rough hill grazing land. The arable land of Scotland is just over three million acres, and of that more than 1½ million acres are under rotational grass. There is no county in Scotland in which over half the farmed area is not under grass, permanent and rotational.

During recent years the manuring and treatment of grassland has received increasing attention. At one time grassland was largely allowed to look after itself, but in recent times there has been a fuller recognition of its importance and of the improvement that can be effected in it by suitable treatment. Investigations have been carried out in many parts of the country and from many different points of view. Some of them have been upon species of grass and clovers and their suitability or otherwise for use under different conditions, others have been on methods of pasturing, manuring and otherwise treating grassland with the object of improving it in the yield and the quality of the crop. Many investigations have also been made into the composition, botanical and chemical, of the herbage yielded by grassland and its variations at different times of year and under different conditions of manuring and treatment.

Towards the end of last century the late Sir William Somerville, then Professor of Agriculture at Armstrong College, Newcastle-on-Tyne, showed at Cockle Park that poor grassland could be greatly improved by the application of basic slag. The improvement effected was shown not so much in the increased weight of herbage as in its improved capacity for feeding sheep and adding to their weight. The untreated pasture contained only a few small weak plants of white clover, but where slag was applied a strong and vigorous growth of clover took place, and this in turn, by fixing nitrogen from the air, increased the growth of grass. The improvement thus produced lasted for many years, and was much greater than that produced by any other system of manuring which was tried in comparison with it. The late Professor Gilchrist, who continued the experiments after the departure of Professor Somerville, found that the use of nitrogenous manures did not produce the effect which many people expected. They produced a greatly increased weight of grass of poor quality and low feeding value, and the use of nitrogen, whether in the form of nitrogenous foods or of nitrogenous manures, was disappointing.

During 1926, methods of intensive management of grassland were introduced into this country, and it was necessary to revise many hitherto accepted ideas. This system of management, developed in Germany during the war by Dr Warmbold at Hohenheim, consists in the production throughout the grazing season of a continuous supply of young herbage, secured by the rotational grazing of the pasture, which receives adequate dressings of phosphate and potash, together with successive and rotational dressings of nitrogen over the late winter, the spring and the summer months. As the system was a complete departure from usual practice nothing was known at the time of its effect on the chemical composition of the herbage. It was claimed that not only is the crop greatly increased, but that young grass is obtained earlier and continues production until later in the season, and that therefore the grazing period is lengthened. Soon after the introduction of the system into this country numerous investigators commenced work upon it, and in 1927 a Pasture Research Sub-Committee, set up by the Advisory Committee on Agricultural Science of the Development Commission, undertook certain experiments in 1928-1931 on grassland representative of several important and widespread types. The report of this Sub-Committee appears in the 'Journal of the Ministry of Agriculture,'[1] and indicates that, on the whole, the application of fertilisers had a beneficial effect on the total yield of dry matter per acre throughout the season; and that the increase in yield was accompanied by an improvement in chemical composition, especially in regard to protein, lime and phosphate.

A very extensive series of investigations into the system has been in progress since 1926, and forms part of a scheme of research at the Agricultural Research Station of Imperial Chemical Industries Limited, at Jealott's Hill, Bracknell,

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[1] 'Journal of the Ministry of Agriculture.' Vol. xxxix., 1932, pp. 24-36.

Berks. Numerous papers on the various aspects of the Intensive System have been published in the 'Journal of Agricultural Science.'

Among other outstanding features arising from these investigations is the finding that "young, leafy pasturage is exceedingly rich in protein and has a far higher feeding value than has hitherto been suspected. The dry matter of such herbage has the character of a protein concentrate like bean meal, containing 70 per cent or more of starch equivalent and including about 20 per cent of digestible protein. Further, this character is to a very large extent independent of the type of herbage or the presence of much or little wild white clover." [1]

The system of intensive nitrogenous manuring, which is carried out during the grazing season, generally goes along with a system of rotational grazing in which grassland is divided into a series of plots which are closely grazed in turn so that they are always kept well eaten down and prevented from becoming coarse, fibrous and stemmy. Such well grazed pasture grass has been found to compare favourably, in respect of digestibility, with concentrates like linseed cake and is far superior to meadow hay. The nutritive value of the pasture grass was found to be highest in the early part of the season, diminished during the comparatively dry mid season, and with the coming of rain recovered, so that the early autumn grass was almost equal in composition to that of early spring.

While the intensive nitrogenous manuring encourages a vigorous growth of young grass, it is "usually at the expense of clover and weeds, but not necessarily to the complete elimination of clovers." [2] The presence of clover in the herbage increases the protein content of the pasture, and to some extent the percentage of mineral constituents.

In a paper, 'Species in relation to the Management and Improvement of Grassland,' [3] Professor Stapledon says, "The importance of the mineral content of herbage has been made abundantly clear as the result of the fundamental researches at Aberdeen. This work bears very closely indeed on the species question, for the clovers tend to be considerably richer in minerals, especially in lime, than the grasses. It has also been shown that herbages decidedly poor in mineral content have almost invariably been devoid or almost wholly devoid of leguminous plants. It is evident, therefore, that clovers as such are of definite value and importance in herbage, and this entirely independently of their reaction on the fertility of the soil and of their effect in keeping weeds in check and giving density to the sole of the sward."

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[1] "Recent Progress in Grassland Research." 'Agricultural Progress,' 1932, pp. 7-11.

[2] 'The Improvement of Grassland.' Bulletin 3, Ministry of Agriculture and Fisheries. Fourth Edition. 1933.

[3] 'Scottish Journal of Agriculture.' Vol. xi., 1928, pp. 125-130.

In the experiments on the Craibstone Drain Gauges in most cases grasses and clovers were separated, and weighed and analysed separately, and the contribution of each to the composition of the pasture can therefore be stated. In the case of many other investigations this has not been done.

During the first rotation, 1921-1926, the drain gauges were under grass in 1923, 1924 and 1925. This grass was not intensively manured, but was treated in the way which is usual among intelligent farmers in the district. The manured drain gauges, Nos. 2 and 3, received in 1923 1 cwt. of sulphate of ammonia for the hay crop, but no manure was given in 1924 and 1925 when the grass was kept short by frequent cutting to imitate pasture. During the second rotation the soil lay in grass for four years, 1929 to 1932. It was treated in the ordinary way during the first two of these years, that is to say the manured drain gauges were given a dressing at the rate of 1 cwt. of sulphate of ammonia, 2 cwt. of superphosphate and 2 cwt. of potash manure salt per acre for the hay crop in 1929. No manure was given for the pasture in 1930.

With a view to ascertaining the effect of intensive nitrogenous manuring on the composition and growth of the pasture the intensive system was tried on these gauges in 1931 and 1932. The Craibstone Drain Gauges have already been described in the 'Transactions,'[1] and the results obtained in the first ten years of their use were given in a second paper published in the 'Transactions' in 1930.[2] The drain gauges are three in number, are cropped in the same rotation as the surrounding field, and with their aid a complete record is kept of all that is put into the soil, of all that is washed away from the soil in the drainage and of all that is removed in the crop. In the course of these investigations the drain gauges are under grass from time to time in the ordinary course of the rotation, and the crops obtained are weighed and analysed.

The three drain gauges are differently treated. No. 1 is unmanured, and has received no manure, either dung or artificials, for about 20 years. No. 2 is manured with both dung and artificials, while No. 3 receives the same manures as No. 2, but is in addition given lime once in the course of each rotation. An account of the manuring up to the year 1929 has been given in the papers already referred to.

The rainfall is measured by a rain gauge which stands beside the drain gauges, while the water which flows through each drain gauge is measured and gives the amount of drainage which passes through the soil. The following table gives the rainfall and the drainage from each drain gauge for all the years the gauges were under grass.

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[1] "The Measurement of Soil Drainage with an Account of the Craibstone Drain Gauges." 'Transactions,' 1921, pp. 56-79.

[2] "A Soil Balance-sheet for a Rotation. Results obtained from Craibstone Drain Gauges." 'Transactions,' 1930, pp. 1-27.

TABLE I.

Rainfall and Drainage in Inches.

Year.	Crop.	Rainfall.	Drainage.		
			1.	2.	3.
1923	Hay	44·19	24·64	23·00	25·21
1924	Pasture	39·56	25·75	24·11	26·52
1925	Pasture	29·79	16·56	17·61	18·12
1929	Hay	36·71	18·22	18·78	16·60
1930	Pasture	38·52	22·72	22·15	22·71
1931	Pasture	31·09	16·04	16·34	16·40
1932	Pasture	34·76	20·41	20·70	20·19

The table shows that in none of these years was there any deficiency in rainfall. In four of the seven years the rainfall was distinctly above the average, which is 34·0 inches, and in two years only, it was distinctly under the average. The grass never suffered from any want of moisture during either rotation. In every year included in the table there was a large amount of drainage from all the drain gauges, but as has been shown in the previous papers in the 'Transactions,' there is very little loss of manurial material in the drainage while the soil is under grass.

When the crop was cut, whether in the hay or pasture grass years, it was at once weighed in the fresh green state. In every year but 1929, the clover was then separated by hand from the grass, and both were dried and weighed separately in the dry state.

Table II. shows the total weight of green crop as cut and the total weight of dry matter obtained in each year. It has been shown in previous papers that very heavy crops are yielded by the drain gauges even on No. 1 which is continuously unmanured. The hay crop on No. 1 in 1923 weighed over 14 tons per acre in the green state, or almost 3 tons 10 cwt. in the dry state. This would correspond to about 4 tons of ordinary hay with 12 per cent of moisture. The manured plots, 2 and 3, gave still bigger crops, but the increase is proportionately not nearly so great as it was with the root and grain crops. This is because, as will be shown later (Table III.), the clover was diminished in quantity on Nos. 2 and 3 by being partly smothered out by the preceding heavy corn crop.

TABLE II.

Weight of Crop. Cwt. per Acre.

Year.	Crop.	1.			2.			3.		
		As cut.	Dry Matter.		As cut.	Dry Matter.		As cut.	Dry Matter.	
		Cwt.	Cwt.	lb.	Cwt.	Cwt.	lb.	Cwt.	Cwt.	lb.
1923	Hay	283	69	76	354	85	104	367	90	20
1924	Pasture	100	22	78	102	23	1	137	30	67
1925	Pasture	161	40	28	149	36	9	217	50	87
1929	Hay	237	61	21	170	49	50	172	49	36
1930	Pasture	81	19	17	88	20	19	97	22	26
1931	Pasture	111	22	60	143	28	58	177	33	109
1932	Pasture	109	23	7	150	30	71	178	35	54

In each of the following years, 1924 and 1925, the crop was cut five times, and was prevented from growing long and flowering. Generally speaking, it was cut about once a month during the growing season, but the times of cutting were largely regulated by the weather, the object being to keep the grasses in the leafy state and prevent them forming flowering stems. The clovers flowered to a certain extent but were never allowed to become ripe and stemmy.

The great diminution in the weight of crops obtained under these conditions is very striking. In 1924 the weight, whether dry or green, is not much more than one-third of that obtained in 1923. In 1925, though it was a much drier year than 1923 or 1924, the weight of crop increased considerably, but was still far short of that obtained in 1923.

TABLE III.

PERCENTAGE OF CLOVER BY WEIGHT IN DRY MATTER.
AVERAGE OF ALL CUTTINGS.

Year.	Crop.	1.	2.	3.
1923	Hay	72·8	65·6	49·5
1924	Pasture	8·3	8·6	12·1
1925	Pasture	16·6	11·1	16·6
1929	Hay	Abundant	Much less than 1	Only a few plants.
1930	Pasture	17·4	31·6	17·5
1931	Pasture	21·5	6·1	5·3
1932	Pasture	18·9	2·3	0·9

The percentage of clover obtained in the dry matter is given for each year in Table III. In 1923 there was much clover on all the plots and especially on No. 1, where nearly three-fourths of the total weight of dry matter consisted of clover. Even on No. 2 practically two-thirds of the dry weight was clover. On No. 3 the clover was much less. This was due to the heavy oat crop in 1922 which smothered out a part of the clover. Quite apart from the manuring, No. 3 yields better crops than the other gauges. Especially is this the case with grain crops. The soil of No. 3 is deeper and better than those of Nos. 1 and 2, which are very similar. In 1922 there was a very heavy oat crop on No. 3 which was partly laid, and this injured the clover and grass.

TABLE IV.

Percentage of Dry Matter in Total Crop.
(Grasses and Clovers together.)

Year.	Crop.	1.	2.	
1923	Hay, 1st cut	25·8	26·2	26·2
	,, 2nd cut	20·2	19·4	19·6
1924	Pasture	22·7	22·6	22·4
1925	Pasture	24·9	24·2	23·5
1929	Hay, 1st cut	26·5	31·0	30·0
	,, 2nd cut	24·6	25·5	25·7
1930	Pasture	23·6	23·0	23·0
1931	Pasture	20·3	19·9	19·2
1932	Pasture	21·1	20·4	20·0

The next Table, IV., shows the percentage of dry matter in the crop in each year. In 1923 the first cut of hay, when the grass was allowed to grow up and became somewhat stemmy, has a much higher percentage of dry matter than the second cut, which consisted largely of leafy matter, especially clover, and contained few flowering stems of grass. The average dry matter in the pasture in 1924 and 1925 is intermediate between these, and is higher in 1925, which was a much drier year, than in 1924.

Complete analyses of the dry matter of the hay and pasture obtained in the first rotation were not made, but the nitrogen, the total ash and the important ash constituents were determined. These are shown in the following tables. The grass and the clover are stated separately.

In Table V. (p. 210) the composition of the grass and of the clover in the first cut hay and in the aftermath is stated separately for each lysimeter. In all cases the nitrogen and albuminoids, as is to be expected, are much higher in the clover than in the corresponding grass. Also in every case the nitrogen and albuminoids are much higher in the aftermath, both grass and clover, than in the first cut. The nitrogen is also somewhat higher in the crops from Nos. 2 and 3, which had received a dressing of sulphate of ammonia, than in the corresponding crops from No. 1, especially in the case of the grass. The difference caused by the presence of clover is, however, much greater than that caused by the manuring, as is also the difference between the more succulent leafy growth of the aftermath as compared with the first cut.

Some of the ash figures are also very instructive. Much attention has in recent times been paid to the ash constituents

TABLE V.

COMPOSITION OF HAY, 1923. 1st *Rotation.*

Percentages of Dry Matter.

Lysimeter	1.				2.				3.			
	First Cut.		Aftermath.		First Cut.		Aftermath.		First Cut.		Aftermath.	
	Grass.	Clover.	Grass.	Clover.	Grass.	Clover.	Grass.	Clover.	Grass.	Clover.	Grass.	Clover.
Nitrogen	0·91	1·81	2·16	3·12	1·33	2·10	2·14	3·25	1·01	2·03	2·06	3·42
Albuminoids . . .	5·69	11·31	13·50	19·50	8·31	13·13	13·37	20·31	6·31	12·69	12·87	21·37
Ash	6·88	8·33	13·07	10·57	8·23	8·02	12·13	10·58	6·84	8·12	13·09	10·82
Insoluble Siliceous Matter .	2·05	0·32	5·36	0·45	3·40	0·36	4·30	0·37	2·44	0·49	5·21	0·71
Potash (K_2O) . . .	1·58	1·19	3·28	1·95	1·58	1·19	3·45	2·30	1·43	1·13	3·06	2·06
Lime (CaO) . . .	0·83	3·20	1·05	3·75	0·80	2·67	0·94	3·29	0·78	2·73	1·09	3·40
Magnesia (MgO) . .	0·33	0·63	0·47	0·86	0·34	0·65	0·45	0·78	0·27	0·67	0·46	0·79
Phosphoric Acid (P_2O_5) .	0·47	0·52	0·80	0·65	0·66	0·48	0·84	0·67	0·68	0·62	0·79	0·64
Sulphuric Acid (SO_3) . .	0·33	0·19	0·77	0·38	0·40	0·24	0·87	0·39	0·39	0·22	0·79	0·40

—often improperly called mineral constituents—of pasture, and especially to the amounts of lime and phosphoric acid which are present. These analyses show that in every case there is a greater percentage of lime and magnesia in the clover than in the grass. In the case of lime the clover has three to four times as great a percentage as the grass. On the other hand the grass has in every case a greater percentage of potash than the clover, while in the case of phosphoric acid there is no great difference, but the grass is generally higher than the clover. Most of the analyses of pasture which have recently been published in this country have been of the whole pasture, grasses and clovers together, and such analyses do not bring out the great extent to which the proportion of ash constituents, as well as of albuminoids, depend on the amount of clover in the mixed herbage.

There is also a distinct difference between the first and the second cuts in the proportions of most of the ash constituents. As might, perhaps, be expected, the leafy second cut is in every case richer in potash, lime and magnesia than the first cut, and is also richer in phosphoric and sulphuric acids.

Table VI. (p. 212) gives corresponding figures for the years 1924 and 1925 when the crop was treated as pasture and cut at intervals so that it always remained leafy and did not grow long and stemmy. The average figures for all the cuts, representing the composition of the total crop for the season, are given in the table for each lysimeter and for each year. In this case the figures for nitrogen and albuminoids are very high, even higher than those for the aftermath in the previous table. In the case of the clovers the percentage of albuminoids is almost always over 24 per cent and reaches 26 per cent. Even in the grasses the percentage of albuminoids is always over 14 per cent. As shown in Table III., the percentage of clover in the herbage was very much smaller in 1924 and 1925 than in 1923.

There is no great difference in the amount of potash in the grasses and clovers, and in every case the percentage of potash in the grasses is rather higher than that in the clovers. It is quite otherwise with lime and magnesia. In every case the lime is about four times as high in the clovers as in the grasses, while the magnesia is also in every case much higher in the clovers. The phosphoric acid on the other hand is always higher in the grasses than in the clovers. It is interesting to note that the herbage, both grass and clover, from the unmanured No. 1 is, generally speaking, as rich in albuminoids and in ash constituents as that from the manured Nos. 2 and 3.

Second Rotation.—Tables II., III. and IV. give results for the grass crops of the second rotation as well as for those of

TABLE VI.

COMPOSITION OF PASTURE. 1st *Rotation.*

Averages for Season.

Percentages of Dry Matter.

Year	1924.						1925.					
Lysimeter	1.		2.		3.		1.		2.		3.	
	Grass.	Clover.	Grass.	Clover.	Grass.	Clover.	Grass.	Clover.	Grass.	Clover.	Grass.	Clover.
Nitrogen	2·41	3·99	2·38	3·99	2·38	4·16	2·26	3·92	2·46	3·64	2·29	4·13
Albuminoids . . .	15·06	24·94	14·88	24·94	14·88	26·00	14·13	24·50	15·38	22·75	14·31	25·81
Ash	10·15	10·22	9·42	10·29	10·18	10·74	7·70	9·44	7·87	9·74	8·55	9·90
Insoluble Siliceous Matter .	3·52	1·36	2·70	0·77	3·16	1·09	2·07	0·50	1·97	0·50	2·60	0·59
Potash (K_2O) . . .	2·90	2·51	2·95	2·62	3·03	2·54	2·51	2·35	2·45	2·38	2·26	2·23
Lime (CaO) . . .	0·64	2·43	0·59	2·59	0·75	2·84	0·66	2·63	0·58	2·83	0·72	3·05
Magnesia (MgO) . .	0·41	0·67	0·36	0·66	0·35	0·67	0·37	0·61	0·35	0·62	0·36	0·63
Phosphoric Acid (P_2O_5) .	1·03	0·73	1·05	0·83	1·04	0·88	0·78	0·69	0·83	0·67	0·81	0·70
Sulphuric Acid (SO_3) . .	0·80	0·40	0·71	0·45	0·75	0·50	0·59	0·36	0·61	0·30	0·65	0·30

the first. The barley crop of 1928, with which the grass and clover seeds were sown, was very heavy—much heavier than the oat crop of 1922. As it had been found that the grass crops of the first rotation had been injured by the preceding oat crop—some of the clover on lysimeter No. 3 in particular was smothered by the grain crop, and this affected the results on the grass for the subsequent three years—barley was grown in 1928 in the hope that it would not smother the grass seeds so much as oats had done. As a matter of fact the barley crop was so heavy that its effect on the clover, and also on the grasses, was much more serious than that of the oats in the preceding rotation. The weight of barley grain obtained from No. 3 was at the rate of 37½ cwt. of dry matter per acre; this would correspond to over 2 tons of barley grain per acre, while the straw was at the rate of about 3½ tons per acre. The crop from No. 2 was not quite so heavy, but it also was a very big crop, while even the unmanured, No. 1, gave a crop of 22 cwt. of dry grain and over 23 cwt. of dry straw.

The result is shown in the Tables II. and III. The weight of hay obtained was in all cases much less than in the first rotation. In the case of lysimeters 2 and 3 it was only about half the weight yielded by the same lysimeters in 1923. More striking still, the manured plots, Nos. 2 and 3, which received a dressing of sulphate of ammonia, superphosphate and potash manure salt for the hay, gave a much smaller crop than No. 1, which had not received any manure for many years. An inspection of the plots showed what had happened. In the spring of 1929 there was a fair amount of clover on No. 1, while there was only a little on No. 2, and on No. 3 only a few weakly plants could be found. The grass also was thin on all the plots, and on none of them was there the vigorous growth of grass and clover which was found in 1923. There was so little clover on Nos. 2 and 3 that the grasses and clovers were not weighed and analysed separately, since the whole amount of clover present on No. 3 would not have provided a large enough sample for analysis.

The whole of the results in subsequent years would have been seriously affected had Nos. 2 and 3 been left with such a thin covering of herbage and with so little clover. All the plots were therefore raked over in the spring of 1929 and resown with grass and clover seeds. The young plants which grew up made little difference to the hay of 1929, but, as shown in Table II., there was a fair amount of clover in the pasture on all the plots in 1930.

The composition of the hay, first cut and aftermath, obtained in 1929 is given in Table VII. In the crops of the second rotation more complete analyses of the hay and pasture, by the ordinary conventional methods of feeding-stuffs analyses, were made.

TABLE VII.

COMPOSITION OF HAY, 1929. *2nd Rotation.*

Percentages.

Lysimeter	1.		2.		3.	
	First Cut.	Aftermath.	First Cut.	Aftermath.	First Cut.	Aftermath.
Dry Matter in Crop	26·5	24·6	31·0	25·5	30·0	25·7
		Percent	ages of Dry	Matter.		
Albuminoids	10·56	17·69	7·13	16·25	6·94	16·38
Ether Extract (Fat, &c.)	2·13	2·22	2·07	1·99	2·00	2·12
Soluble Carbohydrates (by difference)	55·34	47·39	59·65	47·40	59·44	46·51
Fibre	24·79	23·75	25·27	24·11	25·46	24·11
Ash	7·18	8·95	5·88	10·25	6·16	10·88
Potash (K_2O)	1·49	1·59	1·88	2·21	1·43	1·84
Lime (CaO)	2·16	2·80	0·94	2·49	0·90	2·36
Magnesia (MgO)	0·52	0·57	0·26	0·61	0·26	0·63
Phosphoric Acid (P_2O_5)	0·54	0·78	0·55	0·68	0·58	0·78
Sulphuric Acid (SO_3)	0·23	0·35	0·29	0·49	0·24	0·55
Insoluble Siliceous Matter	0·90	1·02	1·28	2·26	1·73	3·01

The analyses show the effect of lack of clover, especially in the first cut of Nos. 2 and 3. The grassy product of these lysimeters gives a larger percentage of dry matter than the mixed grass and clover of No. 1. The albuminoids are much higher on No. 1 than on Nos. 2 and 3, as are also the lime and magnesia of the first cut. The high amount of all these constituents present in the first cut of No. 1, as compared with the same cut of Nos. 2 and 3, is due to the presence of clover, and illustrates clearly how futile it is to compare the percentages of albuminoids and lime in different pastures without taking into account the respective amounts of clover present, or in differently treated plots or fields without taking into account the effect of the treatment on the clovers.

As in the previous rotation, the more succulent and leafy aftermath is higher in albuminoids, and also in the principal ash constituents, than the first cut.

In 1930 the herbage on all the plots was treated as pasture by the method already described, and none of the lysimeters was manured. Though there was now a fair amount of clover in the pasture (Table III.), the total weight of crop obtained was much smaller than in 1929. The crop was cut five times at about monthly intervals, but the total weights both of green material and of dry matter (Table II.) from all the lysimeters were very much smaller than when the herbage was allowed to grow to hay. In this respect the results resemble those of 1923 and 1924.

The average composition of the dry matter of all the cuts from each lysimeter is given in Table VIII. (p. 216). In this case there was sufficient clover on all the plots to permit of separate analyses of the grasses and clovers, and these are shown separately in the table. Much the same remarks apply to these analyses as were made on the analyses of the pasture of 1924 and 1925 (Table VI.). In this case the percentage of albuminoids in both grasses and clovers is even higher than was found in those years. In the case of the clovers it averages 30 per cent, while even the grasses have generally over 18 per cent. There is not much difference in composition between the crops from the manured, Nos. 2 and 3, and from the unmanured, No. 1.

By the autumn of 1930 there was a good covering of herbage, both grass and clover, on all three lysimeters, so it was determined to try the effect of the intensive system of manuring on them for two seasons. In November 1930 a dressing at the rate of 4 cwt. of ground mineral phosphate and 4 cwt. of kainite per acre was applied to Nos. 2 and 3, which had already received a dressing at the rate of 2 cwt. of superphosphate and 2 cwt. of potash manure salt in the spring of 1929. No. 1, of course, received no manure. In 1931, and again in 1932, sulphate of ammonia at the rate of 4 cwt. per

TABLE VIII.

COMPOSITION OF PASTURE. 1930. UNMANURED.

Average of Five Cuts. *2nd Rotation.*

Percentages of Dry Matter.

	1.		2.		3.	
	Grass.	Clover.	Grass.	Clover.	Grass.	Clover.
Albuminoids	17·31	29·37	18·19	30·00	18·69	30·62
Ether Extract (Fat, &c.)	3·97	2·83	3·71	3·00	3·81	2·73
Soluble Carbohydrates (by difference)	45·60	43·08	44·20	39·47	43·98	41·56
Fibre	24·53	16·47	24·60	18·27	24·45	15·70
Ash	8·59	8·25	9·30	9·26	9·07	9·39
Potash (K_2O)	2·46	1·44	2·55	1·87	2·38	1·87
Lime (CaO)	0·65	2·15	0·58	2·19	0·71	2·65
Magnesia (MgO)	0·29	0·53	0·26	0·54	0·22	0·45
Phosphoric Acid (P_2O_5)	0·81	0·67	0·91	0·64	0·88	0·69
Sulphuric Acid (SO_3)	0·59	0·24	0·69	0·25	0·62	0·32
Insoluble Siliceous Matter	2·94	0·94	3·10	1·52	3·17	0·98

acre was applied in 3 dressings to Nos. 2 and 3. The first dressing in each year was at the rate of 1½ cwt. per acre and was applied in March, the second dressing also at the rate of 1½ cwt. per acre was applied at the end of May in 1931 and at the beginning of June in 1932, while the third dressing at the rate of 1 cwt. per acre was given early in September in 1931 and late in August in 1932. In each year the first cut was taken after the middle of May; the second about a month later, in June; the third, three to four weeks later, in July; the fourth, towards the end of August in 1931, and in the middle of August in 1932; while the last cut was not taken till 24th November in 1931 and on 15th September 1932. The times of cutting were regulated to some extent by the weather and the growth of crop. In both years the grasses and clovers were analysed separately, though in 1932 there was so little clover on No. 3 that it did not yield much more than was necessary for analysis. The effect of the manuring on the clovers was very marked. Table III. shows that in 1931, when intensive manuring with sulphate of ammonia began, the percentage of clover on the manured plots fell off very seriously as compared with the unmanured, while in 1932, the second year of intensive nitrogenous manuring, there was only 2·3 per cent by weight of clover left on No. 2 and only 0·9 per cent on No. 3, while No. 1 had 18·9 per cent.

In both 1931 and 1932 the unmanured, No. 1, had a larger crop than in 1930, but not nearly so heavy a crop as was yielded by the second year pasture in 1925. The average yield of green material was 110 cwt. in the two years on this plot, corresponding to about 23 cwt. of dry matter (Table II.), which is quite a good yield for unmanured pasture. Manuring increased the crop considerably, but did not produce crops as great as were produced by the unmanured pasture of 1925 on the same lysimeters. No. 3 which, as already stated, has the deeper and better soil, and has also been limed, gave considerably bigger crops than No. 2. The percentage of dry matter in the crops was lower than in 1930, but this was not due to the nitrogenous manuring, as it is found on No. 1 as well as on Nos. 2 and 3.

The composition of the crops, grasses and clovers separately, for 1931 and 1932 is given in Table IX. (p. 218). The most remarkable feature is the small effect which intensive nitrogenous manuring has had on the composition. There is a small increase in albuminoids in the grass of lysimeters 2 and 3 as compared with that of No. 1, but the increase is not great and is counter-balanced by the fact that the albuminoids are higher in the clover of No. 1 than in that of Nos. 2 and 3. Also the amount of clover on No. 1 is much greater than that on Nos. 2 and 3, so that if we take the average composition of the whole crop, grasses and clovers together, the

TABLE IX.

COMPOSITION OF PASTURE. 1931 AND 1932.

Intensive Manuring.

Average of Five Cuts. Percentages of Dry Matter.

	1931.						1932.					
	1.		2.		3.		1.		2.		3.	
	Grass.	Clover.	Grass.	Clover.	Grass.	Clover.	Grass.	Clover.	Grass.	Clover.	Grass.	Clover.
Albuminoids	17·87	32·69	18·75	30·44	19·94	31·81	18·92	30·76	19·42	29·57	20·18	30·06
Ether Extract (Fat, &c.) .	3·88	2·71	3·96	2·67	4·10	2·92	3·87	3·12	3·93	2·98	3·94	2·84
Soluble Carbohydrates (by difference)	43·80	39·86	42·98	41·63	41·57	38·88	41·31	40·39	40·62	41·65	39·15	41·38
Fibre	23·64	16·41	22·91	15·97	23·50	16·99	24·76	16·41	24·82	16·20	24·72	15·29
Ash	10·81	8·33	11·40	9·29	10·89	9·40	11·14	9·32	11·21	9·60	12·01	10·43
Potash (K_2O) . . .	2·46	0·93	3·40	2·72	2·97	1·78	2·73	0·93	2·90	2·33	2·61	2·39
Lime (CaO) . . .	0·81	2·01	0·68	1·93	0·76	2·28	0·88	2·11	0·82	2·20	0·99	2·31
Magnesia (MgO) . .	0·36	0·46	0·31	0·40	0·25	0·35	0·32	0·47	0·30	0·42	0·28	0·42
Phosphoric Acid (P_2O_5) .	1·07	0·78	1·05	0·77	0·96	0·81	0·95	0·81	0·85	0·87	0·90	0·88
Sulphuric Acid (SO_3) . .	0·64	0·23	1·04	0·37	0·83	0·33	0·85	0·28	1·02	0·32	1·08	0·33
Insoluble Siliceous Matter .	3·82	0·72	3·45	0·84	3·97	0·99	3·27	0·80	3·09	0·87	4·43	1·16

albuminoids of No. 1 are actually higher than those of Nos. 2 and 3.

In order to illustrate this another table has been prepared, in which the composition of the total crop, grasses and clovers together, is given.

Table X. (p. 220) shows that whereas in 1930 before intensive manuring began the albuminoids in Nos. 2 and 3 were higher than the albuminoids in No. 1, in 1931 and 1932, with intensive nitrogenous manuring, the albuminoids in the unmanured crop from No. 1 were higher than those in the manured crops from Nos. 2 and 3. Further, in 1930, the fibre in the crop from 1 is higher than that in the crops from 2 and 3, while the reverse is the case in 1931 and 1932. The same sort of thing is to be seen in the case of the ash constituents. Thus in 1930 lime and magnesia are higher in Nos. 2 and 3, while in 1931 and 1932 the lime and magnesia in Nos. 2 and 3 are lower than in No. 1. In fact, whereas before intensive manuring began, the crops from Nos. 2 and 3 were of better composition than that from No. 1, after 2 and 3 were intensively manured, they gave a crop of poorer composition than that obtained from the unmanured No. 1. This result is quite contrary to what has been generally claimed as the effect of intensive manuring. In order to arrive at a fair result, the effect of intensive manuring on the composition of the herbage should be ascertained, as in this case, by comparing the composition of herbage from intensively manured plots with that of plots which have been equally treated, but not intensively manured. The results obtained in this case are easily explained by the effect of the intensive manuring in diminishing the clovers.

Table IX. again illustrates how much greater the percentage of lime is in clover than in grass. It also shows that the potash manuring given to Nos. 2 and 3 increases the percentage of potash in both grasses and clovers, but especially in the clovers.

It has frequently been shown that the amount of crop obtained, and its composition, varies considerably with the season: this applies not only to grass but to all crops. Temperature, rainfall and sunshine have all a powerful influence upon the growth of vegetation, and as can be easily realised a reduction in one or more of these will retard and alter the growth of crops, and in the case of pasture will alter the composition of the pasture by leading to a survival of certain plants in preference to others. Some species for instance stand up to dry conditions better than others.

In the case of grassland great variations in the amount of crop and also in its composition are produced by drought. During the experiments detailed in this paper the crops never suffered from drought. It has been shown already (Table I.)

TABLE X.

COMPOSITION OF PASTURE. *2nd Rotation.*

Grasses and Clovers Together.

Percentages of Dry Matter.

	1930.			1931.			1932.		
	1.	2.	3.	1.	2.	3.	1.	2.	3.
Albuminoids . . .	19·42	21·92	20·77	21·06	19·45	20·56	21·16	19·65	20·27
Ether Extract (Fat, &c.) .	3·77	3·48	3·62	3·62	3·88	4·00	3·73	3·90	3·93
Soluble Carbohydrates (by difference) . . .	45·16	42·72	43·57	42·97	42·92	41·48	41·13	40·66	39·18
Fibre	23·12	22·60	22·92	22·08	22·48	23·15	23·18	24·62	24·63
Ash	8·53	9·28	9·12	10·27	11·27	10·81	10·80	11·17	11·99
Potash (K O) . . .	2·28	2·33	2·28	2·13	3·36	2·90	2·39	2·88	2·60
Lime (CaO) . . .	0·91	1·09	1·05	1·07	0·75	0·84	1·11	0·85	1·00
Magnesia (MgO) . .	0·33	0·35	0·26	0·38	0·31	0·25	0·35	0·30	0·28
Phosphoric Acid (P_2O_5) .	0·78	0·82	0·85	1·01	1·03	0·95	0·92	0·85	0·90
Sulphuric Acid (SO_3) .	0·53	0·55	0·57	0·55	1·00	0·80	0·74	1·00	1·07
Insoluble Siliceous Matter .	2·59	2·60	2·78	3·15	3·29	3·81	2·80	3·04	4·40

that there was a considerable rainfall in each year during which the lysimeters were under grass. If the period in each year from the beginning of January to the end of September, which includes the growing period for grass as well as the preceding months during which the soil generally lays up a store of moisture, is considered, our records show that there was no deficiency in moisture during this period in any of the three years 1930, 1931 and 1932 during which the soil was under pasture. The average rainfall for this period was 23·64 ins., and of the three years the lowest rainfall in these nine months was 23·82 in. in 1931. 1932 was next with 24·1 in., and 1930 was highest with 26·03 in. In each of these years also the rainfall was fairly well distributed throughout the nine months, so that at no time during the growing period can the crop ever be said to have suffered from drought. These experiments, therefore, do not show what would be the effect of a period of drought on the composition and amount of crop obtained.

It has been pointed out by Dr J. B. Orr [1] that little is known as to the effect of deficiency of rainfall upon the ash content of pastures. He mentions that several investigators have found that during drought the content of lime and phosphate, in particular, was decreased, but increased after moister conditions set in. The percentage of albuminoids also followed a similar course. In the case of these experiments we have had no period of deficiency of moisture. As regards the content of albuminoids, lime, potash and phosphate there is little difference between the different years, and so far as the results go, the greater rainfall in 1930, for instance, does not appear to have influenced the mineral content to any marked extent. The percentage of fibre also does not appear to have been affected in any noteworthy manner by the weather of the different years.

To ascertain the extent to which moisture supply and temperature affect the yield of pasture herbage and its composition, investigations would require to be carried out for a long period and the influence of manurial treatment carefully controlled. Even if we had a single season of drought, such as 1933, during the experiments, that would be insufficient to enable one to form reliable conclusions as to the effect of drought upon the composition of pasture. We have had a period of only two seasons during which the pasture on the Craibstone lysimeters was intensively manured. The results for these two seasons were consistent with one another and so far appear to be reliable.

These experiments lend no support to the view which has been stated, that intensive nitrogenous manuring produces a great improvement in the quality of pasture, and that this is independent of the presence of much clover. On the contrary, the old view that the quality of pasture is greatly influenced by the presence of clover is fully confirmed, as is also the view formerly supported by Gilchrist and others, that though nitrogenous manuring may increase the quantity of material obtained from pasture, it does not improve its quality, but on the contrary makes it worse.

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[1] 'Minerals in Pastures.' 1929. Lewis & Co., London.

The experiments also illustrate in a marked manner the very injurious effect which a heavy grain crop may have on the succeeding grass crop, and especially on the amount of clover in the grass. It is remarkable how the unmanured lysimeter, No. 1, has maintained its fertility for a long period without any manure. This has been referred to in previous papers in the 'Transactions,' but we have here a good illustration of one of the ways in which it is brought about. The unmanured plot contains more clover than the others when it is under grass, and this enriches the soil in nitrogen both during its growth and when the turf is dug into the soil at the end of the grass period.

The soil of the lysimeters has been analysed from time to time. The following percentages of nitrogen were found in samples of the surface soil to 9 inches deep, taken in 1914 at the time the lysimeters were being constructed. No. 1, 0·177 per cent; No. 2, 0·184 per cent; No. 3, 0·180 per cent. Samples were again taken at the end of 1932, after the land had been under grass for four years, and in every case it was found that the percentage of nitrogen had increased as follows: No. 1, 0·203 per cent; No. 2, 0·193 per cent; and No. 3, 0·206 per cent. These figures show a greater increase in percentage of nitrogen in No. 1 during the 18 years from 1914 to 1932 than in No. 2, and as great an increase as in No. 3. Not only so, but in the 1932 samples the ammoniacal and nitric nitrogen, as well as the total nitrogen, were determined in each sample and it was found that No. 1 was distinctly higher in ammoniacal nitrogen and much higher in nitric nitrogen than either No. 2 or No. 3.

The samples taken in 1914, during the construction of the drain gauges, are not strictly comparable with those obtained in 1932 by taking borings from the surface of the gauges, and therefore the figures for the two years cannot be compared too closely. But all the figures obtained, both those for total nitrogen and those for ammoniacal and nitric nitrogen, at least show that No. 1, which is entirely unmanured with both dung and artificials, is keeping up its nitrogen supply as well as Nos. 2 and 3, which have been manured with both dung and artificials, and which in the two seasons before the 1932 samples were drawn had been intensively manured with sulphate of ammonia at the rate of 4 cwt. per acre per annum. In other words, the greater growth of clover in No. 1 during the years it is in grass seems to be able to keep it up to the same level in nitrogen as Nos. 2 and 3 which are manured. This greater growth of clover is mainly due to the fact that the manured plots grow far heavier crops of grain than No. 1, and that those heavy grain crops smother out the clover and to some extent the grass also.

Generally speaking, it may be said that the results obtained with the grass crops in the two rotations show:—

(1) That much greater crops are obtained in the first year under grass when hay is taken, than in subsequent years, but that the hay is not nearly as rich in composition as the pasture.

(2) That a heavy grain crop, in the year in which grass seeds are sown, has a very prejudicial effect on the subsequent hay and pasture crops and especially on the abundance of clover in them. This effect may be greater than any that can be produced by subsequent intensive manuring.

(3) That a plentiful growth of clover has a greater effect in producing herbage of rich composition than intensive nitrogenous manuring.

(4) That intensive nitrogenous manuring greatly diminishes the growth of clover though it increases that of grass, the net result being that the pasture on the clover-rich, unmanured land is as rich in composition as that grown on intensively manured land, or richer.

(5) That the nitrogen supply in unmanured soil is well maintained if there is a plentiful growth of clover while the land is under grass.

It is to be remembered that the unmanured plot, No. 1, not only received no nitrogenous manure, but also no phosphate, potash or lime.

THE PRODUCTION OF BACON PIGS.

By ALEX. CALDER, Ph.D., B.Sc., Pigs Marketing Board, Glasgow.

RECENT DEVELOPMENT.

THE inception of the Pigs and Bacon Marketing Schemes marks the launching of the first organised effort on a national basis to expand and to improve pig production in this country. In recent years we were quickly losing competitive strength to the foreigner in our bacon markets. While certain competing countries had a distinct advantage over us through their lower costs of production, the steadily increasing strength of foreign competition was, in the main, attributable to the high average quality of the bacon exported to our markets. It is, therefore, essential that any marked expansion in home bacon production should be attended by a substantial improvement in the type and carcase quality of home-produced pigs if we are to succeed in supplying the provision trade with an article which will satisfy the discriminating demands of the British consumer.

In the past, producers have made money on pigs of all types and qualities during the peak period of each price cycle, and likewise they have lost money even under the most efficient methods of production when the bottom of a price cycle was reached. These sudden and frequent changes in the level of returns kept pig production in a state of flux, with the result that no appreciable headway was being made either in raising the output of home-produced bacon or in improving standards of production. In order to put pig production on a sound footing a remedy was required which would eliminate the stifling influence of pronounced price fluctuations and which would also make provision for the paying of producers in accordance with the quality of the pigs supplied by them to the bacon factories. The essential points of the remedy required are embodied in the plan of the Pigs Marketing Scheme. Importations of bacon are now restricted and the foreign quota will be modified from time to time in accordance with changes in the volume of home-produced bacon so that producers may reasonably expect a steady margin of profit on their turnover if they are producing on an efficient basis. Furthermore, the risk of an undue disparity arising between costs of production and returns through changes in the costs of feeding-stuffs is reduced to a minimum as provision has been made in the Scheme whereby the price per score will be altered to correspond with any change in the cost of a standard ration.

The Scheme is specifically formulated so as to encourage a steady increase in the production of pigs of sufficiently high quality to replace the foreign article, and this can be readily understood by studying the price variations according to weight and grade. While the economical production of good quality pigs marketed at suitable weights can be relied upon to leave a satisfactory margin of profit, it should be clearly realised that the Scheme is not likely to yield any profit to those who produce on haphazard lines.

PLANNING PRODUCTION.

Many farmers are now preparing to make pig production an integral part of their farming practice. From a business standpoint, it is of primary importance that all producers, and especially beginners, should make a careful reckoning of the line of production which is most appropriate to their holdings. Hitherto, it was advisable that producers who were far removed from good markets for finished pigs should concentrate on the breeding side of production and sell the progeny as weaners or stores to be fattened in areas near to centres of consumption. The disability under which producers in outlying districts were working has been largely removed since the Pigs Marketing Scheme came into operation, and, where the buildings are suitable, these producers should now seriously consider altering their former practice by feeding in addition to breeding and marketing their pigs under contract. Producers in all parts of the country who are supplying pigs through the Scheme are on an equitable basis as regards returns. Throughout Great Britain contract pigs within the same weight class and of the same grade fetch the same price per score of 20 lb. deadweight, and, in every case, the producer is relieved of all transit charges beyond the station at which the pigs are consigned. Those who are at present limiting their production to the sale of young pigs should keep in mind that with further experience of marketing under the Scheme the requirements of store pigs may not expand in proportion to the output of bacon pigs, as many feeders are likely to become convinced of the advisability of combining breeding and fattening. Evidence is rapidly accumulating to show that breeding plays a very important part in determining the carcase grade, and it is to be hoped that an appreciation of this fact will encourage feeders to produce on their own premises their full requirements of young pigs. In cheese-making counties farmers have specialised in fattening during the months when whey was available, but the time will come when these producers will have to consider making provision to produce a more regular supply of pigs throughout the year. As the displacement of foreign bacon progresses it will become increasingly necessary to ensure that more level deliveries of home-produced pigs are supplied to bacon curers throughout the year. On most farms in cheese-making areas housing conditions are not suitable for the winter production of pigs. These producers, however, would do well to realise that in view of the exacting requirements under the Scheme as regards regularity of supplies and quality it will be to their ultimate advantage to provide accommodation which will enable them not only to fatten pigs successfully during the winter months but also to breed at least the greater proportion of their requirements of young pigs.

While it is, from every point of view, very desirable that there should be a rapid break-away from specialisation in fattening and in the sale of store pigs, there are certain conditions under which it is advisable that specialisation should be continued. To the small farmer fattening may be relatively more expensive than breeding, and especially so if he is situated a long distance from a railway station. In following breeding only, provided he is working on a small scale, his requirements of bought-in feeding-stuffs are likely to be considerably less per £ value realised for pigs sold than if he fattened the progeny on rations suitable for the production of good bacon carcases. In selling his pigs he can dispose of a whole litter as weaners or as stores in one lot, whereas, if fattened to be supplied under contract, it might be necessary to draw only two or three pigs for each consignment in order to ensure that the carcase weights are within the stipulated class. With hired transport to convey a few pigs some considerable distance to the station the cost involved, along with other considerations, should suggest the advisability of adhering to breeding only. On the other hand, there are producers rearing and fattening whose production, if carefully costed, would show that the rearing side is being conducted at too great an expense while fattening is yielding satisfactory returns. Such results would be found on many premises where there is no outrun for the breeding stock, in consequence of which the mortality among young pigs prior to weaning is such that it costs more to produce weaners than the price at which they could be bought in. Every producer who is specialising either in fattening or in the sale of young pigs should consider very carefully the possibility that, in view of the altered conditions of marketing brought about by the Scheme, he is likely to profit by making provision for combining breeding and feeding.

BREEDING POLICY.

The influence of breeding on payment grade and on costs of production is much greater than the majority of producers realise. Type is fundamentally bound up with breeding, and while unsuitable rationing may adversely affect the conformation of pigs inherently of good type, faulty conformation due to breeding cannot be corrected by good rationing. Breeding on sound lines constitutes the fundamental requirement to the getting of satisfactory payment grades. Mongrel-bred stock cannot be relied upon to give a high average level of grading, and this is a very important matter deserving the closest attention by producers, as the great majority of pigs being supplied under contract are of mixed breeding. Many are attracted to the use of mongrel stock through their misguided ideas as to what constitutes real economy. Under the Scheme it will soon be found that stock which are bought cheaply because of inferior quality, will prove to be dear at any price. Uniformity of type cannot be expected in litters of mixed breeding. Mongrel-bred offspring are inclined to vary in conformation from types which at the weights of the class contracted for are over-finished and excessively fat to types which are so late fleshing that a killing finish cannot be obtained at the proper weights. Such variations must inevitably result in an unsatisfactory average payment grade. Many are prejudiced against the use of pure-bred stock for the production of commercial pigs, as they believe that cross-breds are more healthy and grow more economically. As has been proved from the results of critically conducted tests, this belief is largely without foundation. While certain strains of pure-breds admittedly do not compare favourably with cross-bred stock from the standpoint of vigour this can rightly be attributed, in most cases, to too close breeding and not to any factor which is inseparately associated with uncrossed stock. The writer has carefully tested and recorded considerable numbers of both pure-breds and first crosses from weaning to the carcase stage, and the findings were that the best strains of the pure-breds equalled the best of the first crosses as regards economical growth, while the pure-breds were distinctly superior as regards uniformity of carcase quality.

The need for making adjustments in breeding is pressing, and those who are breeding from mongrel sows will profit through replacing these with carefully selected pedigree gilts. While strain is more important than breed, stock pigs should be selected from the breed with the best reputation for producing good quality baconers, as certain breeds have a distinctive tendency to finish with more desirable proportions of fat to lean than others. Similar differences between breeds are also distinctly observable as regards firmness of fat produced under the same system of rationing; this is an important point since pigs inherently inclined to produce firm fat can, with safety, be fed more maize or other softening foods than pigs which are inherently disposed to produce a soft fat.

While no satisfactory argument can be advanced to justify the continued use of mongrel-bred stock, the production of first crosses will continue to hold favour with many in preference to pure-breds as baconers. There is, however, much to be said in favour of producing pure-breds only. Grading results differ as from litter to litter, and if the baconers produced are pure-breds the producer is provided with the best possible opportunity of improving the average standard of grading in his herd. He is then in a position to retain in the herd gilts whose litter mates have yielded the most satisfactory grading results. By following this policy the only hazard confronting the producer lies in the danger of losing some of the improvements made when a new sire is introduced. In order to obviate this risk, as far as possible, boars should likewise be selected on strictly utility lines. The prospective purchaser should satisfy himself that the stock closely related to the sire chosen should have proved their utility worth, as evidenced by grading results, to be equal to, or preferably better than, that of the females with which he is to be mated. Where first crosses are produced a constructive breeding policy cannot be pursued with the same degree of thoroughness, as discarded sows cannot be replaced with their own progeny. The writer is inclined to the opinion that the combined production of first crosses and three-quarter-breds constitutes a sounder production policy than the breeding of first crosses only. This procedure reduces very considerably the requirements of bought-in gilts. In the breeding of Large White-Large Black crosses the best of the gilts can be retained in the herd and mated to a Large White boar. The first cross sow is usually very prolific and an excellent mother and the three-quarter-bred offspring are not likely to be less uniform in quality than the first cross of the parent breeds. This, however, is the utmost limit to which crossing can advantageously be carried out.

THE STOCK BOAR.

Sweeping advances in the quality of commercial pigs could be made if the folly of using scrub boars was fully appreciated. At least 30 per cent of the boars in general use to-day belong to the scrub category and their influence is a definite menace to the pig industry. Those who keep careful records of costs of production and returns from their litters realise to what extent an inferior boar is costly at any price. It is being observed that the progeny of different boars used in the same herd may give widely different grading results. Boars of similar type may or may not differ as regards their influence on the grading of their offspring, but a boar of correct conformation may on the average be expected to sire progeny which are at least one grade superior to the progeny sired by a boar of inferior type. If two such boars during the course of their respective breeding lives sire 400 pigs each which are marketed under contract at the average deadweight of 8 score, then the net difference in returns from the two sets of progeny due to grading only will amount to the astonishing figure of £80. Furthermore, it is highly possible that the progeny of the superior boar would prove the more economical as regards food consumed per lb. of live weight increase. As a general observation based on the ruling market prices for boars of different standards of quality, it may safely be stated that few boars bought at less than double the price of a first-class baconer are good investments to their purchasers. Yet, the price of a commercial pig is as much as many breeders are prepared to offer for a boar. Small farmers with accommodation for only a few sows feel that it is over-capitalising production to pay the price required to secure a first-class sire. This difficulty, however, can be got over if the small breeders within a given area would form a breeding society for the purpose of obtaining a premium boar. Every pig producer who is using an inferior boar should allow himself to be convinced that the extra cost of acquiring a better sire is likely to be recouped manifold.

MARKET REQUIREMENTS—WEIGHTS.

There is enormous scope for improvement in the quality of pigs supplied as contract deliveries. Under the Scheme it is of the utmost importance that pigs should be marketed to conform with the weights of the class or classes contracted for. The highest grade prices are paid for pigs of Class I. weights. In this class the carcase weight limits range from 140 lb. to 170 lb.; these weights are best suited to the requirements of factories handling pigs for the Wiltshire and Ayrshire cures. With the exception of the Midlands of England, the majority of curers throughout the rest of the country desire to contract for Class I. pigs only. Having regard to the excessive weights at which a large proportion of producers were accustomed to market their pigs prior to the inception of the Scheme, it is not surprising that during the first two months of grading a large percentage of pigs exceeded the weights of the class contracted for. While there has been a marked improvement in regard to the supply of pigs at appropriate weights, the percentage of overweights is still unduly high. The terms of contract are such that producers are liable to lose heavily on pigs supplied in excess of contract weights. Under the Wiltshire contract now operative, pigs outwith Class I. plus tolerance are ungraded and paid for at 6d. per score less than basic price if accepted as contract delivery for the manufacture of bacon. Under the general contract which governs the supply of pigs in Classes II., III. and IV., in addition to Class I., overweight pigs accepted for the manufacture of bacon are more heavily penalised, as they are paid for at 6d. less than Grade C. price of the class in which they fall. Stated otherwise, overweight pigs put into bacon under a Class I. contract are paid for at Grade D. price. It is therefore going to affect adversely a producer's returns if, by the supply of overweights, he has to accept Grade D. price, provided similar pigs of appropriate weights give an average return of Grade C. price or more. The point which is deserving the utmost emphasis regarding overweights is that the curer has the option to reject them. It is only when the prices on the open market are considerably higher than Scheme prices that a serious loss on rejected pigs can be averted. Curers are not bound by the terms of contract to reject heavy pigs prior to the stage at which Scheme pigs are weighed as dressed carcases. Where pigs are singed, this process is carried out prior to the removal of the primary offal and weighing. Singeing considerably lowers the selling value of a carcase on the pork market, and pigs dressed "hair on" for the Ayrshire cure are also lowered in value for pork purposes. Pigs rejected on hoof, where this can be arranged, are not likely to lose value to the same extent, but even following this procedure the pigs cannot be marketed in the best condition if they have been transported some considerable distance and reloaded several times. Having regard to the peculiar disabilities under which rejected pigs have to be sold, together with the fact that all marketing expenses and the transport costs from the producer's station are deducted from the price realised, it should be clearly evident to every producer that in order to prevent leakage in returns, all contract pigs should be carefully drawn for consignments at safe weight.

A weighing outfit should be an integral part of the equipment of every piggery from which pigs are supplied under contract. The range of weights in each Class is not sufficiently wide to allow of even the most expert producer relying upon his own judgment with complete success. The advisability of weighing is now widely realised, but many producers hesitate to meet the initial cost. For the purposes of the small producer, a crate, a tackle and a spring balance capable of weighing up to 400 lb. will be sufficient. When pork prices are low the loss on four rejected overweight pigs might be more than equal to the cost of this outfit. Those producers who do not recognise the advantages of weighing are mainly influenced by the belief that, at heavy weights, pigs can be produced more cheaply per score and that no real loss is being sustained through the return of a somewhat lower price per score. Such a belief, however, is seriously misleading to those who hold it, as there is plenty of evidence to show that the meal consumption per lb. of live weight gain increases consistently from weaning onwards.

The judicious drawing of pigs for contract delivery is an art which as yet is possessed by few. The range of live weights which will correspond with the range between the weight limits of Class I. carcases differs considerably according to circumstances. Other factors being equal, pigs transported long distances to bacon factories yield a lower killing percentage than pigs which are conveyed a short distance to the place of slaughter without reloading. Fine-boned, fleshy pigs of early maturing type yield a substantially higher proportion of carcase to live weight than pigs manifesting the opposite characteristics. The normal differences between the killing percentages of these two types ranges between 3 and 6 per cent. Well-fed pigs of good type should, unless transported long distances, yield 75 per cent of carcase to live weight. Calculated on fasted live weights the killing percentages of pigs handled under contract, according to producers' figures, have varied from 69 per cent to 81 per cent. However, in order to keep within Class I. weights, producers can safely reckon upon selecting pigs to a minimum of 200 lb. live weight, which, if yielding 140 lb. carcase weight, represents a 70 per cent kill. The maximum safe live weight limit is reckoned to be 220 lb., which represents a 77 per cent kill on a carcase weight of 170 lb. Where considerable numbers of pigs are being supplied under contract they should be weighed and drawn once a week. As to whether it is advisable to draw the pigs near to the minimum weight limit or the maximum weight limit depends almost entirely upon type. Pigs which carry a lot of fat and which, therefore, tend to be less satisfactory on the back than on the belly grades, should be drawn at light weights, whereas it is in the producer's interests to market fine-shouldered, lengthy pigs towards the maximum safe weight limit. In order to get reliable guidance from weighing, those pigs which are reckoned to be clearly approaching the marketable stage should be fasted before weighing takes place. Close attention to weighing will amply repay every producer supplying contract pigs.

BACON TYPE.

The light weights at which pigs are required to supply Class I. carcases at once suggests the necessity of concentrating on the production of pigs of early maturing type. It is essential that pigs should be carrying a satisfactory degree of finish at marketable weights. Late maturity is still prevalent in many strains of the recognised bacon breeds. Pigs manifesting this characteristic are inclined to concentrate their live weight increase on growth to an undesirable extent, with the result that it is difficult to secure a proper killing finish at Class I. weights. Carcases which lack finish yield unsatisfactory returns both to the producer and to the curer. Good finish is essential to the securing of high belly grades. It should, therefore, be carefully noted in the planning or, perhaps, re-planning of production that late maturing types will not satisfactorily fulfil requirements under a Class I. contract. It is likewise inadvisable to produce for the bacon market pigs which are inherently inclined to take on a killing finish before Class I. weights are reached. Pigs of this type, if marketed at Scheme weights, are likely to be over-finished and excessively fat, which results in a low back grade.

In general conformation pigs likely to mature at Class I. weights must combine fleshiness and length together with fineness of bone and depth at the flank. The back fat grade is measured at the point where the shoulder or neck fat shows the greatest depth. This being so, good conformation of the shoulder is an essential feature of a high grade baconer. The shoulder conformation can best be judged by viewing a pig from the front. An unsatisfactory shoulder is signified by the blades bulging beyond the line of the side with an undue set towards the vertical, and this results in the top of the blades being too wide apart. A shoulder of this type is likely to result in an unsatisfactory payment grade. In order to get a good back grade it is essential that the blades should almost converge at the withers. Any indication of nape, sometimes referred to as "bull-neck," is very undesirable, as the presence of this characteristic is a certain sign of very thick shoulder fat. The opinion is widely held that fineness of shoulder is closely associated with lack of constitution resulting from under-development of the chest. There might be some justification for this opinion if the lungs and heart were placed between the shoulder blades—chest capacity is, however, primarily determined by fulness of girth and spring of the rib. Fineness or otherwise of the shoulder has little, if any, bearing on the development of the girth. Occasionally pigs are observed which, although heavy shouldered, fall away behind the blades and behind the withers on the top to give inadequate chest capacity. There is a close association between length and thickness of back fat, and while length is not measured in the grading, the undue sacrifice of this important characteristic is safeguarded through the extent to which short pigs are penalised on the back fat grades. Selection for length is important, but there would appear to be an optimum length beyond which the gain through extra stretch of side would be more than offset by loss in development of quarter and thickness of flank. It is difficult to forecast with any degree of accuracy the thickness of the belly. It is, however, clearly evident that pot-bellied pigs and shallow-sided, light-flanked pigs cannot be expected to give satisfactory belly grades. Depth of side and straightness of under-line appear to be the key points in conformation which indicate good belly measurements. A straight underline cannot be obtained on a deep-ribbed pig unless the hind-quarters are deep fleshed. A deep side and lack of second thigh produces a curved underline which is likely to yield a low-grading streak. The ideal bacon pig should, therefore, be wedge-shaped like a dairy cow.

MANAGEMENT—REARING.

No stage in the production of bacon pigs confronts the producer with so many difficulties as rearing during the first fourteen weeks after farrowing. Conformation and carcase quality are, in no small measure, influenced by the management of the suckling litter and the handling of the pigs immediately following weaning. The success or otherwise of pig production from a business standpoint depends upon the relationship of costs of production to returns. In order to keep production costs at a satisfactory level it is important that the management of breeding stock should be conducted on lines such as will ensure the obtaining of an average litter number of eight well-nourished weaners. The total cost of rearing a small litter is seldom appreciably lower than that of rearing a large litter. At the present costs of food a litter of six will cost approximately 5s. per head more than a litter of eight.

Success in rearing cannot be obtained where the housing conditions are unsuitable. Sows with young litters must have warm and dry pens if heavy mortality is to be avoided during the winter and spring months. It may be frequently observed that, even in apparently warm quarters, the young pigs resting beside the sow show a constant tremor of the skin. This definitely indicates that the young pigs are suffering from cold, which in all probability is being caused by a draught passing down the wall of the building and then spreading across the pens at a low level. An effort should be made to trace such draughts to their source and to stop them, but where this cannot be done the danger from chill will be greatly reduced if a spread of straw is put across the top of the pens over the beds. Relatively few producers appreciate fully the extent to which the use of farrowing crates can save mortality among young pigs. By reason of the warmth of the bays in which the young pigs are accommodated, the farrowing crate not only reduces the incidence of mortality due to crushing but also losses due to chill. By the time the sow is removed from the crate the young pigs are less liable to suffer from cold.

The proper nourishment of the young pigs depends upon the efficiency with which the dam is rationed. For the production of a good milk supply a suitable balance of protein and carbohydrate is necessary, and, in order to prevent digestive trouble arising both among the sows and the sucklers, the mechanical consistency of the ration must be carefully studied. Although variations in the relative costs of foodstuffs and change of season will, from time to time, justify the making of alterations even in rations which are giving satisfactory results, every producer should recognise a standard ration for each stage in production which can be safely used at all times, and any substitutions which are made should be carefully based on the appropriate standard ration.

STANDARD RATION FOR NURSING SOWS.

Fine White Thirds . . .	40	per cent.
Ground Barley	30	,,
Brown Sharps	20	,,
Fish Meal	10	,,
	100	

The suitability of this ration for producing healthy well-nourished litters has been well proved, and it is particularly suitable for the rearing of winter litters. The Brown Sharps are included in order to prevent the ration becoming pasty when mixed with water. A pasty ration is dangerous, since it tends to constipate the sows, and this may have the effect of loading the milk with poisons to such an extent as to cause deaths among the young pigs from either jaundice or 'fatty heart.' Despite the relatively high price of Fish Meal, it is unquestionably the most satisfactory protein food for winter rearing. For summer and early autumn rearing this ration can be advantageously cheapened by replacing the Fish Meal with 10 per cent Meat and Bone Meal. If the sows and litters are getting access to good pasture, the Brown Sharps can be partially or wholly replaced by Maize Meal. In order to lower costs and to include the maximum of home-grown food, the following alternative to the suggested Standard Nursing Ration should be considered :—

NURSING RATION.

Fine White Thirds	28	per cent.
Ground Barley	30	,,
Ground or Bruised Oats . .	30	,,
Soya Bean Meal . . .	7	,,
Fish Meal	5	,,
	100	

In this ration 5 per cent of the Fish Meal is replaced by 7 per cent Soya Bean Meal, which is the maximum quantity of this food that can be recommended. Soya Bean Meal definitely stimulates increased milk production. While Ground Oats may be used in place of the Brown Sharps and part of the Thirds, it should not constitute more than 30 per cent of the total ration.

Even where the rationing is satisfactory there are at times heavy losses among young pigs due to scour, which is the principal disease affecting young pigs. The difference between a feeding scour and infectious scour must be clearly recognised. Infectious scour does not occur until about three weeks after farrowing, and its approach can be readily diagnosed by the paleness of the skin and the sickly yellowish whiteness of the face. The successful prevention of this trouble necessitates the realisation that infectious scour does not simply arise as the result of the infection of an otherwise healthy body, but that it is induced by a predisposing ailment. The ailment which predisposes scour is bloodlessness, and the prevention of bloodlessness is the course to take in order successfully to combat scour. Iron salts have proved to be specific in restoring the blood to satisfactory condition. The iron requires to be fed to the young pigs, because, if fed to the sow, insufficient iron is passed into the milk to constitute a medicinal dose. A 2·5 per cent solution of iron sulphate given at the rate of one teaspoonful per pig per day will, if administered in time, protect young pigs against the ravages of scour.

POST-WEANING STAGE.

If the sows are being fed on a ration similar to that previously suggested as a suitable standard, then the same ration can be successfully fed to young pigs prior to and after weaning. The sow's ration, however, should not be fed to the young pigs if it contains oats or other foods which are difficult to digest. The following ration has been proved to be excellent for weaners:—

STANDARD RATION FOR WEANERS.

Fine White Thirds	50 per cent.
Ground Barley	20 ,,
Flaked Maize or Maize Meal	20 ,,
Fish Meal	10 ,,
	100

During recent years the practice of replacing Fish and Meat Meals by Soya Bean Meal and Minerals has become fairly widespread in the feeding of growing and fattening pigs. It is, however, questionable if results justify the use of Soya Bean Meal, despite the extent to which it cheapens the cost of the ration. Except where the young pigs have been badly nourished on the sow, there is no need to incur the extra expense of using Flaked Maize instead of Maize Meal.

Young pigs should not be allowed to lose their milk flesh after weaning, and it takes careful management to prevent this happening. During the winter and spring months many breeders consistently fail to maintain the milk bloom on their pigs, with the result that during the period of five to eight weeks after weaning the pigs yield little live weight increase. This check in development has many serious repercussions, the most apparent of which is the heavy food consumption per lb. of live weight gain. At this stage low condition and low vitality are closely associated, and there may be a heavy mortality due to 'thumps,' culminating in pleurisy or pneumonia. A set-back in development after weaning induces a sacrifice of fleshing qualities which will adverselyaffect the grading of the pigs as baconers. Producers would be well advised to note that if the milk layer of flesh on the belly is lost it will not be re-established when the pigs improve in condition, and the belly measurement will lose its thickness by the absence of this layer of flesh. A marked loss in condition after weaning constitutes the most undesirable form of a store stage. The pigs will, thereafter, maintain a lean growth for a considerable time, and, having lost the capacity to produce fat and lean in suitable proportions, the finishing stage will lead to a rapid increase in the thickness of back fat, while there will be a considerably lower rate of increase in the belly thickness.

In order to conserve the milk flesh it is usually advisable to dose the young pigs twice with Santonin. If there are no worms to expel, the treatment, nevertheless, has not been in vain, as it seems to act as a constitutional. Irrespective of the merits of the ration being used, infestation with worms considerably checks the growth of young pigs. Good rations will keep most of the other common ailments of young pigs in abeyance. At this stage the use of skim milk, if carefully fed, has a remarkable influence in maintaining bloom and in promoting growth. Many abuse the feeding of skim milk. If there are limited and irregular quantities available it is often fed too liberally while the supply lasts, and then there is no allowance until the next supply comes to hand. If fed in this haphazard manner the use of skim milk may do more harm than good. It should be properly soured before being fed to pigs, otherwise curdling takes place in the stomach, and this is liable to give rise to digestive troubles. Skim milk is usually fed as a drink, but the writer is of the opinion that better results are obtained when it is mixed with the meal and fed in this manner. When skim milk is discreetly fed, the meal consumption per lb. of live weight increase is lowered to an extent that cannot wholly be attributed to the food value of the milk, and this may be accounted for by the extent to which the efficiency of digestion and assimilation is raised. The relative proportion of skimmed milk and meal which yields the most efficient results from the standpoint of food consumption has yet to be determined. Excellent results have been obtained by feeding one gallon of skim milk to every 10 lb. of meal. When water is mixed with meal some considerable time before being fed, an undesirable sourness tends to develop which renders the food unappetising. When skim milk is used there is no danger of any such staleness arising. In fact there appears to be some reason for believing that the digestibility of the ration is improved by mixing the meal and the milk at least several hours before feeding. The balance of the liquid requirements of the pigs should be supplied in the pens and not added to the mixture of meal and milk. In view of the high protein content of skim milk, the proportion of Fish or Meat Meal can be reduced by one-half when one gallon is allowed to every 10 lb. of meal. Pigs under four months old are influenced in their condition and growth to a much greater extent than older pigs by the feeding of skim milk, and if the supply is either limited or dear its use should be discontinued after the pigs reach 100 lb. live weight. The influence of skim milk on young pigs during the first two months after weaning is so marked that even at the present low price of feeding-stuffs it is worth threepence per gallon, whereas it can be bought at half that price.

INTERMEDIATE STAGE.

Between the approximate live weights of 90 lb. and 140 lb. bacon pigs should be fed on an intermediate ration, of which the following can be regarded as a suitable standard :—

STANDARD INTERMEDIATE RATION.

Fine White Thirds	40	per cent.
Ground Barley	30	,,
Maize Meal	20	,,
Fish Meal	10	,,
	100	

During the summer and autumn months the Fish Meal can be replaced by Meat Meal. If pigs at this stage do not receive Fish Meal during the winter there is danger of considerable loss being experienced through stiffness. Many producers hold the opinion that if home-grown oats cannot be sold at a profit, a large percentage should be included in the pig rations. It must, however, be kept in mind that as oats have a low feeding value for pigs, a better net return may be obtained by selling the oats at a very low price and by purchasing more suitable grains the cost of which may be even 30 per cent higher than the selling value of oats. It will, however, prove quite satisfactory to substitute Oats for Thirds up to the extent of 20 per cent. Ground Wheat is an excellent food, and when used in limited quantities its feeding value is superior to that of Fine White Thirds, and it renders the ration more appetising. When available on the farm or obtainable at the price of its offals, Wheat can with advantage be used to replace up to 30 per cent of the Fine White Thirds. When used in greater proportions, Ground Wheat tends to make the ration pasty and indigestible. Where surplus wheat and oats are available on the farm, 20 per cent of each can be used, thus completely replacing the Fine White Thirds. Intermediate rations containing 30 per cent of Maize Meal have been widely used with excellent results. However, since the Pigs Marketing Scheme came into operation it would appear to be advisable not to feed more than 20 per cent of Maize Meal even at the intermediate stage, otherwise both the back fat and the belly grades may be adversely affected.

THE FINISHING PERIOD.

In the production of baconers the change to the finishing ration can usually be most appropriately effected when the pigs are about 140 lb. live weight. It is very important that the finishing ration should not contain excess of foods likely to produce a carcase of soft quality, and that there should be a correct balance of carbohydrates and proteins. A soft or yellow fat will result in the rejection of carcases, and in this connection it is very important that feeders of swill should be very careful regarding the quantity of this food used during the two months preceding slaughter. If swill is used at this stage it should be supplemented with a good meal, consisting mainly of Thirds and Barley Meal, otherwise some of the carcases may be too soft for the manufacture of bacon. Swill is also inclined to depress the grading of the back, and in order to reduce its fat-producing influence to a minimum, the surface fat should be removed from the vats when steaming takes place. The other principal food coming within the category of industrial by-products is Flour Sweepings. While this food produces a firm carcase, it has such a pronounced tendency to produce excess of fat that not more than 20 per cent should be used in any ration.

An inadequate supply of protein in the ration stimulates the rate at which fat is deposited on the back and ribs, and adversely affects the thickness of the streak. A good standard finishing ration should contain not more than 25 per cent Maize Meal and not less than 25 per cent Thirds or other suitable wheat offal, together with 5 per cent of a protein-rich food such as Meat Meal. The following ration is very suitable for the fattening of bacon pigs :—

STANDARD FINISHING RATION.

Fine White Thirds . . .	30	per cent.
Ground Barley	45	,,
Maize Meal	20	,,
Meat Meal	5	,,
	100	

Ground Wheat or Oats can completely replace the Fine White Thirds without adversely affecting the grading. Barley Meal can be replaced by Flour Sweepings or Biscuit Meal to the extent of 20 per cent. The use of Rice Meal is not recommended, as it has a distinctly adverse effect on colour and firmness, and is particularly unsuitable for feeding to bacon pigs. Since grading commenced it has been observed that many pigs of excellent type have given very unsatisfactory belly grades where the finishing ration contained as much as 30 per cent of Maize. This result may be attributable to the large quantity of Maize used, as the other grains, such as Barley and Wheat offal, could not be suspected of adversely affecting the belly grade. With a view to lowering production costs, Soya Bean Meal is frequently used as the source of protein in the finishing ration. While Bean Meal is a firming food and regarded as such, very few producers seem to realise that Soya Bean Meal definitely has the opposite effect on quality. It is therefore very inadvisable to use more than 20 per cent of Maize Meal when Soya Bean Meal is included in the ration. Where Ground Wheat is used Soya Bean Meal should be omitted, as a combination of these two foods produces a ration which is inclined to be heavy and indigestible and also liable to produce soft quality carcases. Fish Meal should not be included in the finishing ration owing to the danger of producing tainted bacon.

In preparing the ration for feeding, it is customary to add considerable quantities of water to the meal. This is a practice which in the feeding of bacon pigs is strongly to be condemned. Liquid supplied along with the ration may be consumed in quantities which are far in excess of body needs, and this arises through the pigs endeavouring to satisfy their requirements of solid food. If the stomach is from time to time heavily loaded with liquid the belly muscle becomes stretched by the increased pressure. Through the stretch of the belly muscle the thickness of the streak is lowered, thereby adversely affecting the grading of the belly. It would appear that many well-fed pigs of excellent type grade badly on the belly as a result of the injudicious feeding of liquid. There is another advantage to be gained through limiting the amount of liquid fed with the meal. When the mixture is of such a consistency that all the moisture is held in the meal the ration is crumbly and open in texture, and this is conducive to efficient digestion. If a large quantity of liquid is added, the finest of the meal tends to be carried to the bottom of the container, and this portion becomes pasty, as a result of which the digestibility of the ration is adversely affected.

SUPPLEMENTARY RATIONS.

In cheese-making areas, where pigs are primarily kept for the purpose of consuming whey, it is possible that, with further experience of grading, producers will find it advisable to modify considerably their customary methods of feeding. When the value of bacon pigs was such that no margin of profit could be expected from any meals that were fed, it was sound business to follow the policy of consuming the maximum of whey with the minimum of pigs. However, when meal feeding can show a satisfactory return the position is con-

considerably altered. As a suitable supplementary ration of meal results in a more efficient utilisation of whey and also in an improved quality of carcase, it follows that there is a certain optimum ratio of whey to meal which will yield the best net return. Under the new marketing system this optimum ratio cannot be ascertained until experience of grading during the whey feeding season is acquired. In order to keep the liquid allowance at a satisfactory level, cheese-makers may find it advisable to stock as many pigs as will obviate the necessity of feeding more than ½ gallon of whey per lb. of meal. If this system cannot be followed through lack of accommodation, it may prove to be sound business to provide the extra accommodation required. Unlike skim milk, whey is a fat-producing food, and when supplemented by a meal consisting of Maize, satisfactory grading results cannot be expected. In order to obtain more flesh on the belly and less fat on the back, the following ration should provide a suitable supplement to whey :—

SUPPLEMENTARY RATION.

White Thirds	40	per cent.
Barley Meal	30	,,
Maize Meal	20	,,
Meat Meal	10	,,
	100	

In utilising surplus potatoes for pig feeding it is, as in the case of whey, very important that a suitable supplementary meal ration should be used. For all pigs other than yeld sows potatoes should be properly cooked. When potatoes are plentiful even young pigs are sometimes fed large proportions. This is a mistake, as pigs under the age of fourteen weeks are liable to suffer from digestive troubles and to die through pressure on the heart if fed the large ratio of potatoes to meal that can successfully be allowed to older pigs. It is sound policy not to feed any potatoes to young pigs until the meal consumption reaches the level of 2½ lb. per head per day. Thereafter the meal allowance can be maintained at 2½ lb. until the pigs are marketed as baconers and the total increase in food can be given as cooked potatoes. At bacon weights pigs will be consuming at least 14 lb. of cooked potatoes in addition to the 2½ lb. of meal. This system is easily carried out. The meal mixture should contain sufficient protein to balance the deficiency of protein in the potatoes, and as the allowance of potatoes is increased the ration is automatically balanced to suit the reduced proportion of albuminoids required with increase in weight. The following constitutes a suitable meal mixture to feed with potatoes :—

SUPPLEMENTARY RATION.

Fine White Thirds . . .	50	per cent.
Barley Meal	30	„
Meat and Bone Meal .	20	„
	100	

Maize Meal should not be included in this supplementary ration, as when fed with potatoes it tends not only to produce an excess of fat but also to cause weakness in the legs.

PROSPECTS.

The success or otherwise of bacon production in this country is largely bound up with the extent to which producers strive to help themselves. The marketing of pigs of unsuitable weights and carcase quality for the manufacture of bacon will, under the new marketing system, not only reduce the producer's returns to an unprofitable level, but also impede the success of the efforts now being made to give the home-produced article a reputation on our own markets superior to that of any imported bacon. The Pigs Marketing Scheme serves to provide an opportunity whereby efficient producers can with a high degree of certainty rely on getting a credit balance between costs of production and returns, and it is therefore of the utmost importance that every producer should make a serious effort to take full advantage of this opportunity.

AGRICULTURAL RESEARCH IN SCOTLAND IN 1933.

BEING A BRIEF SUMMARY OF WORK AT THE SCOTTISH AGRICULTURAL RESEARCH STATIONS DURING THE YEAR.

Readers desiring fuller information on any of the subjects mentioned should write to the Director of the Station at which the investigation is being carried out.

INSTITUTE OF ANIMAL GENETICS.

UNIVERSITY OF EDINBURGH, WEST MAINS ROAD.

Cattle.—The experimental work at the farm of Shothead, Balerno, is being pursued. This deals principally with the inheritance of milk yield and quality, but also covers other qualities of cattle. In the meantime, to consolidate the position, as it were, a complete review has been made of the published literature on the subject of the inheritance of milk yield. A great deal has been written, but much of the information is conflicting, due probably to the different environments and the different types of cattle employed by the different experimenters.

It is generally agreed that butter-fat yield is inherited independently of milk yield. To a great extent, the two characters are essentially independent of each other in their transmission. The ash content and colour of the milk appears to be more influenced by breed than by nutrition. The breed variation in the vitamin content is not significant. Persistency in milk yield is important from an economic point of view. What is required is not so much the cow which gives a high flow of milk and then quickly dries up, but rather the cow that will maintain a consistent flow throughout a longer period.

There is much controversy as to the number of factors involved in the transmission of the character of milking capacity. At least twelve different theories have been seriously put forward. There are points of reconciliation amongst them all. In the first place, it is too much to expect that milk yield would be inherited in a simple manner at all analogous to the colour inheritance. There is no doubt that hereditary factors affecting the size and the constitution of the animal have an indirect effect of considerable importance upon her milking capacity. Thus, many genetic factors play a part. It is not, however, improbable that certain factors affecting the mammary development, &c., may play an outstanding part in the transmission of milk yield. There is reason to believe that total yield of milk is in part conditioned by a factor inherited in a sex-linked manner.

Horses.—The stud of Shetland ponies is continued, both in connection with physiological inquiry by members of this Institute, and for Professor Linton of the Royal (Dick) Veterinary College, who is studying the composition of mares' milk.

Pregnancy Diagnosis.—The examination of equine urine for the hormones of pregnancy continues to engage attention, and an extensive equine pregnancy diagnosis service has been built up. By the biological test employed it is possible to diagnose pregnancy in the mare from about the sixtieth day after service with a high degree of accuracy.

Pigs.—In view of economy, the Government grant for research work in pigs has been entirely withdrawn. The plant has therefore to be self-supporting. Nevertheless, an endeavour is being made to continue the records which were previously kept. In view of the decreased staff there has been neither time nor opportunity to analyse these records.

Sheep.—The investigation of problems concerning the inheritance of wool characteristics has progressed. During the last four years experiments destined to throw light on the inheritance of black-spots and kemp in fleeces have been carried out, and a large amount of information has been collected and analysed. It is now known that kemp fibres in Blackface wool (and probably in Cheviot wool) could be reduced to negligible proportions by suitable selection and breeding. Under present conditions, unfortunately, economic conditions governing the price of Blackface wool are such that no adequate remuneration would reward the farmer who undertook the necessary trouble and expense to produce kemp-free Blackface wool. Nor does there appear to be much immediate hope that Blackface wool will be purchased by manufacturers upon a basis of kemp-content. The work relating to kemp in Cheviot wool is not yet completed.

The investigation of certain inherited deformities in lambs has progressed. There is now strong evidence to show that 'sow mouth, cleft palate and hare-lip (which appear to be only differing degrees of the same genetic condition), as well as deformity of the limbs, are definitely inherited defects. The latter condition has been given careful study, and an arrest of neuro-muscular development has been determined as the actual cause of the deformity. A number of sheep-owners have reported an extension of sterility or impotence among rams during recent years. The Institute has given assistance in dealing with the condition in seven instances. In some instances nothing could be done, but sex hormones have been used with encouraging results in several rams.

The investigations concerning the details of reproductive physiology in the sheep have been continued, and have thrown a good deal of light upon certain conditions which have hitherto been difficult to understand. For instance, it has been shown that the effect of 'flushing' ewes before service is to convert a latent or quiescent heat period (which can be demonstrated to occur in the absence of 'flushing') into a fully functional one in which successful mating can occur. The physiological effect of 'flushing,' in other words, is not to stimulate the ovaries to produce female germ cells but to stimulate the remainder of the generative system to effect those changes which are associated with œstrus or heat. Further light is being thrown upon twinning and the effect of various factors upon the lamb crop. The general observation that the greater proportion of twins occurs amongst the first 50 per cent of the ewes to lamb appears to be correct, but confusion has arisen in many instances by including amongst the figures gimmers' lambs. The majority of gimmers lamb late rather than early in the lambing period, and most, of course, produce only a single lamb. This tends to create a bigger proportion of single lambs born late than early.

Rabbits.—Investigations with reference to the different types of fur grown by rabbits are necessarily still incomplete. The evidence tends to suggest that a finer textured coat is dominant to a coarser type; a slight sex difference has also been noted. Density of coat appears to be a dominant character, but it is likely that multiple factors are concerned in both these cases.

The question of moult is being studied, and it appears that there is a distinct tendency for protracted moulting periods to be inherited. Should this be confirmed by the collection of further data it will prove of considerable importance to rabbit breeders.

The production of new varieties referred to in the last report has not made great progress. Most of these are only expected to appear once in 256 times, so that a large number have to be bred in order to produce even a single individual. The breeding stock, however, has been increased, and more success is hoped for in the present season. Two new varieties are being investigated. One, the Golden Glavcot, has been adopted already as a recognised variety by the National Rabbit Council, whilst two others will, when established on true breeding lines, be useful additions to the fur-bearing rabbits.

The second case of somatic segregation presented to the Institute last year—a black-blue Dutch rabbit—has been bred from, but among his some hundred offspring none have exhibited both the recessive and dominant character as he does.

Work on the curley-coated rex, studies on the sex ratio, duration of pregnancy, litter size, &c., are still proceeding, but it will be some time before sufficient data are available to give conclusive findings.

ANIMAL DISEASES RESEARCH ASSOCIATION.

MOREDUN INSTITUTE, GILMERTON, EDINBURGH.

Louping-Ill.—The controlled field trials designed to test the efficacy of a protective vaccine, which were carried out in 1932-33, were extended. Approximately 5000 hoggs and 11,000 lambs were inoculated, and similar numbers were used as controls. The results indicated that the vaccine was of real protective value, and that by its use the incidence of louping-ill could be reduced to a very considerable extent. Further trials are in progress.

Tick-Borne Fever.—This disease of sheep, which in many areas in Scotland exists concurrently with louping-ill, was proved to be a distinct entity, and its pathology has been extensively studied.

Intracellular bodies, occurring principally in the white cells of the blood, were found to be specific to tick-borne fever, and there is now strong evidence that they represent the causal organisms of the disease. The nature of these bodies is being studied, particularly with reference to the possibility of their undergoing cyclic changes.

Ixodes Ricinus.—With the object of obtaining effective methods for the ultimate control of the British tick, *Ixodes ricinus*, the study of its ecology has been continued, and the deterrent effects of various forms of dip have been investigated.

Lamb Dysentery.—The demand for lamb dysentery serum has markedly increased in recent years: in 1933 approximately 70,000 doses were issued from the Institute, and the results of its use were entirely satisfactory.

Braxy.—As previously reported, the use of formalinised whole culture (anaculture) vaccine has been found to reduce the braxy mortality to less than 1 per cent.

Hitherto a double dose vaccine has been employed. With the object of determining whether similar good results can be obtained by a single dose vaccine, field trials were set up. In these, over 6000 hoggs received a double dose of vaccine, and an approximately equal number were vaccinated with a single dose. Should the single dose vaccine prove satisfactory, it will effect a further economic saving to the flock-master.

Enzootic Abortion in Ewes.—The experiments designed to test the possible association of enzootic abortion in ewes with diet deficient in minerals or in accessory food factors, are being continued, but have not yet reached a stage at which definite conclusions can be drawn.

Grass Sickness.—This important disease continues to be intensively investigated. A special study was made of certain toxins found to be present in the bowel of acute cases. This line of investigation will be more extensively prosecuted during the 1934 grass sickness season.

Bovine Abortion.—The investigation which the Association has undertaken in conjunction with the Scottish Committee on Contagious Bovine Abortion has, as its definite object, the production of a vaccine which is at once safe and effective. The work, which has so far been confined to small animals, is still in its early stages, but definite progress is being made.

Scrapie.—In 1932 there was instituted a field experiment which was designed to determine whether the disease could be transmitted through the medium of ground infection. This experiment continues, but a period of two years must elapse before definite evidence can be obtained.

A systematic study of microscopic changes associated with the disease is being carried through.

Pine.—It was discovered in 1932 that the disease known as pine, which affects sheep and young cattle, represented a deficiency of iron in the blood. It has been found that this condition occurs in various parts of Scotland, and the administration of iron, both as a preventive and a curative, has proved of specific efficacy.

ROWETT RESEARCH INSTITUTE.

BUCKSBURN, ABERDEEN.

Results of fundamental research work in nutrition carried out at the Rowett Research Institute, and of experiments which have now been completed and which were of interest, have been published in appropriate scientific journals. The space available for this report is, therefore, devoted solely to an account of work of immediate practical importance which has been carried out on the Duthie Experimental Stock Farm during the past year. This account has been prepared by Mr Arthur Crichton, Head of the Duthie Experimental Stock Farm.

Fodder Crop Conservation.—During the year considerable attention has been paid to the question of grassland management and to the conservation of fodder in the form of surplus grass and other green fodder crops.

Our present knowledge of the botanical characteristics of the various herbage plants and of manuring has brought pastures in recent years to a high level of stock-carrying capacity in summer. The balance between summer grazing and winter crops in the ordinary rotation has tended to become upset and the problem is now one of how best to conserve most effectively the surplus grass at the peak of production in summer. It is also believed that, since winter feeding has tended to become unprofitable, it may be economical to encourage the production of late and early growing pastures. By this means stock might be left outside longer, winter feeding become less expensive, and stock would thrive better when they went on to summer pasture.

An experiment is being carried out to test in which of the following states surplus grass can be more efficiently preserved.

1. Hay.
2. Silage, cold fermentation process.
3. Silage, cold fermentation process plus molasses.
4. Silage, with the addition of acid and molasses (D.E.F.H. solution).
5. Silage, with the addition of A.I.V. acid.

A record is being kept of the produce per acre, and by analysis and weighing, the losses incurred in preserving by the different methods. In addition, feeding trials are being carried out with the different materials to test their palatability.

A number of silos to hold 15 to 20 tons of silage were constructed to see whether and by what method a green fodder crop consisting of a mixture of oats and legumes could be most practically conserved for use for outwintered stock. Some of the silos were filled by a silo-cutter in the ordinary way; in others the material was ensiled in the long state. The respective losses are being determined by analysis, and tests of the palatability of the material and its keeping qualities are being made. Where the crop is cut into short lengths, well packed and handled, the addition of acid does not appear to be of any marked benefit.

Another method of conservation is by drying. Dried grass was not available, but a feeding trial was carried out on dairy cows with dried lucerne. The swing-over method was used. Where 10 lb. of dried grass replaced (1) the concentrates required for 1 gallon of milk, (2) 15 lb. of swedes and (3) 4 lb. straw in the maintenance ration, there appeared to be a definite check in the normal fall in milk yield. Colour tests showed that the fat was more yellow on the dried grass ration. Further experiments are presently being carried out with other samples of dried grass to ascertain whether these results can be confirmed, and whether the method of drying affects the nutritive value.

An experiment with different plots has been laid down to test the production of the individual grasses of a mixture, as compared with these grasses in mixture. Suitable manuring for the individual grasses and for the mixture has been applied, and the production will be measured by stock-carrying capacity and by taking samples at random from plots for analysis.

Cattle.—The experiments to determine the most economical method of rearing calves are being continued and a number of the animals have now been fattened and slaughtered. The rearing of up to eleven calves per cow by suckling has now become an established practice on the farm.

Pigs.—Joint experiments by the Colleges of Agriculture have been carried out to demonstrate the comparative values of commonly used rations. Interim results have been discussed at meetings of the Advisory Committee on Pork and Bacon Production and further experiments outlined. The latter are now in progress, and are designed to test (1) the value of decorticated earth-nut meal against fish meal, and (2) the optimum proportion of oats which can be used in the ration.

A number of groups of pigs were allowed, after weaning, exercise *ad lib:* for varying periods before being penned up for fattening in order to determine the effect on the quality of the carcase. No significant differences were observed.

Other crops were used to find the amount of green food in the form of cabbage which the growing pig can most efficiently utilise. This investigation is to be repeated and developed.

Poultry.—Experiments outlined by the Joint Poultry Research Committee have been continued. With high levels of soya bean meal a form of leg weakness in chicks occurred. Further investigations will reveal whether this condition is associated with the particular kind of soya meal used, or whether it is due to a mineral, vitamin or amino acid deficiency.

For the last three years pens of White Leghorns have been given the same feeding, management and housing, in order to determine the results of hatching at different dates. At the present level of egg prices it appears that the beginning of April is the optimum date.

In collaboration with the Chemist to the Highland and Agricultural Society, birds have been fed different and increasing amounts of salt in order to determine the amount which will prove toxic. Severe diarrhœa is the first and obvious symptom of a dangerous proposition, and death occurs after about half an ounce per day has been fed for some time.

The optimum amount of salt in a cereal ration with soya bean meal as the protein supplement appears to be stabilised at one-half per cent of the mash.

Sheep.—A group of Grey Face ewes which had lambed early in 1932 were again weaned early in 1933 to determine whether there is any correlation between early weaning and early mating. So far it appears as though early mating was an inherited characteristic.

Complete records continue to be kept in all departments for the purpose of costing various enterprises and of collecting data with regard to practical, apart from experimental, activities.

THE SCOTTISH PLANT BREEDING STATION.

Craigs House, Corstorphine, Edinburgh.

Investigations are being carried out on oats, herbage plants, swedes and potatoes, but each year only one of these is made the subject for report in the 'Transactions.' This year some notes have been prepared on the work with swedes, which were last referred to in 1930.

The swede, like other root crops, is usually selected and seeded in mass, and a variety bred in this way cannot be expected to have the same purity of type as, for example, a new variety of oat, which has been fixed first and then multiplied up from a single seed. The aim of this Station has been to examine the possibility of breeding 'pure lines' of swede, and to see whether varieties of greater uniformity and value can be produced by this method. Plants are selected from crops, and self-fertilised by enclosure of the flowers in pollen-proof bags to yield seed, which is sown in observation plots. Each subsequent generation is propagated by a single selection. While the sixth generation has now been reached in the investigation it is still too early to make any pronouncement as to the value of the method. Some lines seem promising, others, though not better than the parent variety from which they originated, may breed true for some good character which might be combined with other qualities by suitable hybridization. This is an additional use of the pedigree line. In recent years the selection of new strains has been mainly from crosses between pedigree lines. In the second generation from a cross, the characters of the parents are distributed in many different combinations. Selection at this stage may secure a strain having good characters from both parents. Such strains, however, need many generations of self-fertilisation before they can become true-breeding.

With regard to the effects of self-fertilisation on uniformity, considerable information has been obtained. Some characters, such as the habit of growth of the shaw and the colour of the skin, soon become uniform. Bronze-tops can be eradicated from purple-top strains, and dark and light bronze-top skin colours can be discriminated. The amount of red on the bronze-top, however, still varies with the season and the amount of sunlight. Plants that are in exposed positions develop more colour than those that are shaded. Shapes such as ‘ tankards ’ and ‘ globes ’ breed true within a rather wide range of fluctuation. For example, tankards may or may not have a ‘ waist ’; they may be symmetrical if they grow upright, but are just as liable to malformation when knocked over or blown about by the wind in the seedling stage. A certain type of soft-fleshed early swede has a wide range of shapes which in profile vary from convex to straight on the sides, and selection of either extreme does not appear to lessen this variability. The great range in bulb weights also still persists, for these characters depend very much upon the fertility of the soil within reach of the roots, the water supply and the effects of crowding and shading.

The average bulb weight of strains grown under the same conditions is found to differ. If it were only a matter of selecting a line of greater yield, it would be comparatively easy to obtain a plant from a maincrop variety the progeny of which would outyield the parent variety, but such a line would most probably be of earlier type, and should be compared with earlier varieties. This introduces the question of dry-matter percentage, which is still the most convenient check on the value of increased yield. Generally speaking, the different classes of swede range from earlies with great bulb weight and low percentage of dry matter, to maincrop with small weight and high percentage; so that the yield of dry matter of the various types is almost the same.

Selection on the basis of dry-matter content is therefore being investigated, but on the understanding that size and appearance must not be sacrificed for dry-matter yield. About one hundred bulbs, ranging from medium to large, are taken from evenly spaced drills in a plot and tested for weight and dry-matter percentage, only those which are above average in both respects being selected for breeding. The progenies are tested in yield trials, and their relative values compared with the relative values of the parent bulbs. Much of the size of these large parent bulbs is always due to good nutrition, but if there are hereditary tendencies in that direction as well, they may be expected to appear in the offspring. Similarly, tendencies for high dry-matter percentage may be sought. Generally, either high weight or high dry-matter percentage is found to be accidental in the parent, since one or other often disappears in the offspring.

Summarising other less important problems, it may be mentioned that the inheritance of colour in skin, flesh and flower of swede and turnip has been under examination. Characteristics of the leaves and tendencies to bolting, splitting and other malformations of the bulbs are observed. A specially infected plot is employed for the observation and selection of swedes showing resistance to finger-and-toe disease. 'Bulbless bolter' rogues of swede crops have been received from various sources, and have so far either been similar to rape, or in a few cases, to hybrids of swede × rape. This cross has therefore been examined, and the hybrid products of swede × turnip have also been under observation.

THE WEST OF SCOTLAND AGRICULTURAL COLLEGE.

(*a*) MILK PRODUCTION DEPARTMENT.

Attention continues to be given to some problems reported on in previous years, while certain new problems have been tackled. Several of these may be mentioned.

Potatoes.—In view of the glut of potatoes occurring at certain times a trial with them as a feed for cows was conducted. They gave satisfactory results and compare well with swedes on the dry-matter basis—a pound of dry matter in potatoes is of the same value as a pound of dry matter in swedes. About 20 lb. per head daily of potatoes is a suitable allowance for cows.

A.I.V. Fodder.—This recently introduced feed was tested. The fodder prepared from hay aftermath was found to be of about the same value as ordinary silage.

The Protein Allowance.—For several years now the protein requirements of the dairy cow have been studied with a view to cheapening the ration. In a recently completed trial the ration consisted of hay, beet pulp and a grain mixture, with either decorticated earthnut meal, decorticated cottonseed meal, or palm kernel meal as the protein supplement. No significant variation in production was found, though the digestible crude protein in the grain mixture varied from 12 to 18 per cent.

Hoven or Bloat.—It would appear that where bloat occurs in cows on ordinary pasture this is largely due to the presence of a saponin in wild white clover. This saponin prevents the release of the gases formed in the rumen, or first stomach, and so induces bloat. The cyanoglucoside present is probably also partly responsible for bloat by causing partial paralysis of the stomach walls. This problem is receiving further attention.

Copper Damage to Pasture.—A case was found where pasture was destroyed by the drip from telephone wires. This was near an industrial area.

Digestive Trouble in Calves.—At a farm where there had been serious losses among the calves for two consecutive seasons, no obvious defects in the feeding or management could be found. Samples of the milk were taken and these were found by the Milk Utilisation Department to produce a hard curd. The addition of two fluid ounces of a 7½ per cent solution of sodium citrate to each gallon of milk fed ended the trouble.

Pasteurised Milk for Calves.—In a test of the relative feeding values of raw and pasteurised milk a total of 35 calves were used. The winter calves were on test for 150 days and the spring calves for 120 days. Both bulls and heifers were used, and from three weeks of age they received hay and a grain mixture.

Some had colostrum for ten days and then raw or pasteurised mixed milk. Others had colostrum for five days only and then pasteurised milk.

In the bulls those on raw milk did best, followed by those that had colostrum for ten days and then pasteurised milk. With the heifers different results were obtained. Those put on pasteurised milk at ten days took two months to catch up on the raw milk group, while those put on pasteurised milk at five days of age took longer to do this.

(*b*) MILK UTILISATION DEPARTMENT.

Milk Investigations.—An analysis of over 300 individual samples of farm milk in which some latent defect occurred showed that the commonest cause was mammitis. The causal organism in most cases was found to be the streptococcus, but considerable numbers of staphylococcal infections were encountered. Mammitis caused by staphylococci is more difficult to detect clinically because it is frequently slower in developing and does not afford positive evidence of its presence by the strip cup examination. For this reason, this form of mammitis may be present in the herd for a considerable time before the owner is made aware of the fact. A reduction in the milk yield, a lack of sweetness and quality in the milk and difficulties in cheese-making, are effects which usually induce the dairy farmer to have his herd milk critically examined. In infected herds, the incidence of mastitis is high; in several which we examined this year, from 60 to 80 per cent of the cows were affected.

Faults in market milk, not associated with udder disease, which were prevalent during the past year were found to be commonly caused by contamination during production, by an impure water supply or by metallic effects. Oiliness, ropiness and a burnt flavour were some defects in farm milk which were investigated and eliminated.

A considerable number of faulty butter samples were submitted. Rancidity caused by lipolytic bacteria, by moulds and by the lipase ferment, was the commonest defect: weakness in body was found in some cases to be associated with the employment in excess of some specific foods, and in others to errors in technique. In raw cream butter, bad flavours were frequently traceable to udder infections in the cows.

Butter Experiments.—Swedes, potatoes and A.I.V. silage were assessed for their effects on butter-making. Each of these foods was found to have a definite effect on the character of the butter. A.I.V. silage produced butter with the fullest colour, but a pleasing shade was imparted by swedes. Potatoes, on the other hand, resulted in a very white butter of poor technical qualities. From the standpoint of body and texture in the butter, roots were superior to A.I.V. silage, and much in advance of potatoes.

Cheese Experiments.—A medium has at length been devised in which the causal agents of discoloration (bleaching) in cheese can be studied under controlled conditions. Some significant results have already been obtained with the help of this medium.

The relationship of selected lactic acid bacteria of the streptococcus lactis type to the flavour, and more especially to the body and texture of cheddar cheese, has been investigated. By the use of a special starter, it was found possible to reproduce with exactitude the thin rind, soft pliable texture and the creamy white colour characteristic of the Old English Cheddar.

Starter Investigations.—Microscopic studies of slow working and active starters did not reveal any characteristic by which they could be differentiated, nor was it found possible by any of the several methods tried (addition of substances like albumen, fruit or vegetable juices, yeast extract, the seitz filtrate of fresh raw milk or a special broth culture) to activate cultures of lactic acid bacteria which had lost their faculty of rapid acid production in milk. On the other hand, a laboratory method of determining the vigour of starters such as are of value in cheese-making was found to give informative results. Methods by which vigour in starters may be retained even after propagation for lengthy periods in sterilised milk are now being investigated.

THE HANNAH DAIRY RESEARCH INSTITUTE.

KIRKHILL, AYR.

Nutrition.—The investigations into the influence of the *quality* as distinct from the *quantity* of the protein in the rations of milking cows, which have been in progress during the past three years, have now been rounded off. The results show clearly that the composition of the protein may materially alter its feeding value, and that the feeding value of proteins can be correlated with their amino-acid composition. Amino-acid analyses of the proteins of a number of typical feeding-stuffs have been made, so that figures are now available for assessing their relative nutritive values.

Milk Secretion.—Further fundamental work has been carried out to determine the effect of blood composition on the secretion of milk, the ultimate object of such work being to ascertain whether there is any direct correlation between the composition of the food, the composition of the blood and the composition of the milk. Considerable progress has been made in determining the precursors of the various milk constituents—*i.e.*, the form in which the digested food is transported to the secretory gland.

Genetics of Dairy Cattle.—During the year the investigation of the genetic construction of the Ayrshire breed, mentioned in the last report, has been largely extended, and the degree of inbreeding has been determined in typical groups of cows *e.g.*, high milk yielders *versus* low milk yielders, and vessel-bred *versus* milk-bred stock.

Tuberculosis.—The results of the small scale experimental scheme into the eradication of tuberculosis from dairy herds has been published. The results are of value not only in demonstrating the feasibility of eradicating tuberculosis from ordinary herds by fairly simple methods, but also in indicating the chief sources of infection in such herds and the methods by which they can be eliminated. The report also deals in detail with the reliability of the double intradermal tuberculin test, and gives a summary of the methods adopted and the results obtained in tackling tuberculosis in other countries.

The results of a co-operative investigation into the tuberculous infection of milk have also been published. These results show clearly the high rate of tuberculous infection at present existing in the raw milk supply of the country, and the means by which such infection can be minimised.

Pasteurisation.—Reference was made in last year's report to the publication of an exhaustive survey of literature relating to the relative nutritive values of raw and pasteurised milk. This has now been supplemented by a short study of certain economic aspects of pasteurisation, including the effect of pasteurisation on producers' and consumers' prices, the influence of compulsory pasteurisation on producer-retailers and small dairymen, and its effect on clean milk production and disease eradication.

Condensing and Drying of Milk.—A study of the factors affecting the occurrence of heat coagulation in evaporated milk and of insolubility in milk powders is being continued. Methods of determining protein solubility have been examined and a useful modification of existing technique devised. Work is at present in progress on certain defects in evaporated milk products, and also on the methods of production of canned cream. In the latter investigation the Institute is working in close collaboration with the Royal Technical College, Glasgow.

THE MACAULAY INSTITUTE FOR SOIL RESEARCH.

Craigiebuckler, Aberdeen.

Soil Testing and Advisory Work.—This branch of the Institute's work has been continued and extended. The results of laboratory methods are being checked against the results of field and pot experiments and the most suitable methods selected for advisory purposes. Several hundred soil samples have been examined by these selected methods and the results reported on in light of the soil type, the rotation followed, &c. The bulk of this work is connected with the estimation of the manurial and lime requirements of soils, and the reports issued provide the farmer with information on the content of the soil in readily soluble phosphoric acid and potash and in organic matter; they also indicate whether or not lime is required, and if so, in what amount.

Pot Culture Work.—Determinations of available plant nutrients by the Mitscherlich method (see last year's report) were again carried out on a range of soils from different geological formations in Scotland. Pot experiments were also conducted to compare the effects of different phosphatic fertilisers when applied to different types of soil.

Field Experiments.—Field experiments were carried out on thirty-seven farms throughout the country with a view to estimating, in the field, the amounts of available nitrogen, phosphate and potash. Several of the soils were included in the pot experiments and, in addition, all the soils were investigated in the laboratory. It is hoped in this way to obtain rapid and accurate laboratory methods for the estimation of 'available' plant nutrients.

Special Investigations.—The investigations and experiments in connection with *mechanical draining* which were already in progress have been continued, and tests have been carried out with a drainage plough on a variety of soils.

Work on the measurement of soil colours has included the preparation of a colour chart.

The joint investigation with the Animal Diseases Research Association on '*Pine*' has been continued, and the results have been published.

Further work on *hill pastures* in Midlothian has been carried out in conjunction with Mr R. G. Heddle of the Edinburgh and East of Scotland College of Agriculture, and the investigations at Craigiebuckler into the effects on the soil of various chemical *lawn treatments* have been continued.

A study is being made of the composition and distribution of *organic matter* in some typical soil profiles from the N.E. of Scotland, including forest humus layers under spruce, fir, beech and birch, and in connection with this work several new methods of analyses have been worked out.

The laboratory and field investigations on the acidity and *lime status* of various soils have been continued and extended, and work is being carried out on two forest soils in Aberdeenshire in order to ascertain the factors associated with differences in the growth of trees.

Soil Surveys and Geological Work.—Soil Surveys are being carried out on:—

1. The eastern part of Kincardineshire.
2. Durris, Aberdeenshire.
3. Teindland, Morayshire.
4. Insch, Aberdeenshire.
5. Areas of waste land in Lanarkshire (in connection with the County Council's investigations into the possibility of land reclamation as a means of alleviating unemployment).

The mineralogical study of the soils of the north-eastern area of Scotland has been continued, and a detailed study is being made of the mineral content of the soils and parent materials in Kincardineshire.

Peat Soils.—The financial situation rendered inevitable the curtailment of the experimental programme at the Macaulay Demonstration Farm in Lewis, and no further land has been reclaimed during the past year. Satisfactory results were obtained, however, from pasture experiments carried out on land already reclaimed, and it is evident that with suitable treatment much of the poor grazing land in Lewis could be greatly improved.

Experiments with a range of grasses and clovers in small plots have been continued, and promising results have been obtained with sweet clover.

Throughout the year the milk produced by the tuberculin-tested cows at the farm has been sold in Stornoway, and the poultry work has continued to develop. The schemes inaugurated by Mr Macaulay to encourage the poultry industry in the island have now resulted in the formation of a co-operative society under the title of Lewis Egg-Producers Ltd.

In addition to the work in Lewis, survey work is being undertaken in different parts of the country with a view to classifying the peat deposits and obtaining some information as to the effects of climate, topography, &c., on their development. Advisory work is also undertaken on peat soils, and research work, as outlined under 'Pot culture' and 'Field experiments,' is being carried out.

Study of the Drainage Constituents of the Soil.—The study of the composition of soil drainage and the losses suffered by the soil through drainage has been continued. The results obtained from the Craibstone drain gauges for the year 1932 confirmed those of the previous year—*i.e.*, in spite of heavy nitrogenous manuring there was no increase in the loss of nitrogen in the drainage waters. The increase of crop due to the intensive treatment was confined to the grasses. The clovers were seriously diminished.

During 1933 the lysimeters were cropped for the first time with potatoes which were planted in April, 1½ cwt. sulphate of ammonia per acre being applied to Nos. 2 and 3 in May, No. 1 being as usual unmanured. The crop was lifted in October, weighed and analyses made.

Farmers may obtain advice regarding manurial and lime requirements of their soils, also copies of reprints of articles published and any other information in regard to the work of the Institute by applying to the Secretary.

MILK RECORDS.

THIRTY-FIRST YEAR—RECORDS OF 32,456 COWS.

By WILLIAM STEVENSON, B.Sc., N.D.A., N.D.D., Superintendent,
The Scottish Milk Records Association.

SYSTEMATIC milk recording in Scotland was continued in 1933 under the direction of the Scottish Milk Records Association on the same lines as in 1932 and previous years. The scheme of private or unofficial milk records for unregistered herds inaugurated in 1924 was also continued during this year.

The Association in 1933 consisted of the following members:

Name and Address.	Body Represented.
Mr Thos. Barr, Hobsland, Monkton	Central and South Ayrshire Milk Recording Society (5 Circuits).
Mr William Mitchell, Bennan, Straiton	
Mr William D. M'Cubbin, Lochlands, Maybole	
Mr William D. Wardrop, Rigg, Auchinleck	
Mr Andrew Wilson, Finlayston, Ochiltree	
Mr George Templeton, Carnell Farm, Hurlford	Central Ayrshire No. 2 Milk Recording Society.
Mr Alex. Y. Allan, Aitkenbar, Dumbarton	Dumbartonshire Milk Recording Society.
Mr Matthew Cochrane, Catlinns, Lockerbie	Dumfriesshire Milk Recording Society (3 Circuits).
Mr Robert Miller, Shawsholm, Closeburn	
Mr Mungo Sloan, Hunterhouse, Lochmaben	
Mr Robert Lohoar, Greenlees, Cambuslang	East Kilbride and District Milk Recording Society (2 Circuits).
Mr Alex. Paterson, Cathburn, Newmains	
Mr Hugh Andrew, Lennoxlove, Haddington	East Lothian and Border Milk Recording Society.
Mr Robt. M. Reid, The Glen Farm, Falkirk	East Stirlingshire Milk Recording Society.
Mr A. Dryburgh, Methilhill, Windygates	Fife Milk Recording Society (2 Circuits).
Mr Gilbert R. M'Garva, Estates Office, Colinsburgh	
Mr D. J. Gordon, Cullaird, Inverness	Highland Milk Recording Society.
Mr Dugald Graham, West Backs, Campbeltown	Kintyre Milk Recording Society.

Name and Address.	Body Represented.
Mr John T. Kirkwood, B.Sc., N.D.A., Scorrieholm, Lesmahagow	Lesmahagow Milk Recording Society.
Mr Andrew C. M'Candlish, Ph.D., B.Sc., Auchincruive, Ayr	Lower Wigtownshire Milk Recording Society.
Mr Robert Laird, Lawthorn, Irvine	North Ayrshire (John Speir) Milk Recording Society (3 Circuits).
Mr J. M. Matthew, Girthill, Saltcoats	
Mr Thomas Murdoch, West Tannacrieff, Kilmarnock	
Rt. Hon. Lord Carnegie, K.C.V.O., Elsick, Newtonhill	North of Scotland Milk Recording Society (3 Circuits).
Mr J. R. M'Caw, Douneside, Tarland	
Dr Wm. Sinclair, North Loirston, Nigg	
Mr Robert Howie, Flatterton, Greenock	Renfrew and Bute Milk Recording Society (2 Circuits).
Mr John Telfer, Branchal, Bridge of Weir	
Mr James Whiteford, Caldcoats, Newton Mearns	Renfrewshire (Upper Ward) Milk Recording Society.
Mr Andrew Cochran, High Ardwell, Kirkcolm	Rhins of Galloway Milk Recording Society (4 Circuits).
Mr John Forster, Mains of Larg, New Luce	
Mr Alex. N. M'Caig, Challoch, Stranraer	
Mr James Wither, Awhirk, Stoneykirk	
Mr H. G. Baird, Kirkchrist, Kirkcudbright	Stewartry of Kirkcudbright Milk Recording Society (5 Circuits).
Mr George Barbour, Auchengibbert, Crocketford	
Mr T. Graham Clement, Howwell, Kirkcudbright	
Mr William P. Gilmour, Balmangan, Borgue	
Mr Hugh Hastings, Powillimount, Kirkbean	
Mr George Stewart, The Drum, Bo'ness	West Lothian Milk Recording Society.
Col. W. T. R. Houldsworth, Kirkbride, Maybole	The Ayrshire Cattle Herd-Book Society of Great Britain and Ireland.
Mr James Howie, Muirside, Holywood	
Mr John R. Miller, Midkelton, Castle Douglas	
Mr A. W. Montgomerie, Westburn, Cambuslang	
Mr James Kilpatrick, Craigie Mains, Kilmarnock	The British Friesian Cattle Society.
Mr John Telfer, Branchal, Bridge of Weir	
Mr W. P. Gilmour, Balmangan, Kirkcudbright	The Highland and Agricultural Society of Scotland.
Mr Alex. Munro of Leanach, Culloden Moor	
Mr Alex. Murdoch, East Hallside, Hallside	
Mr James Dunlop, Midland, Prestwick	The West of Scotland Agricultural College.
Principal W. G. R. Paterson, 6 Blythswood Square, Glasgow	
Lord Rowallan, Rowallan, Kilmarnock	
Mr A. Cunningham, Ph D., B.Sc., 13 George Square, Edinburgh	The Edinburgh and East of Scotland College of Agriculture.
Mr Alexander Lauder, D.Sc., 13 George Square, Edinburgh	

Name and Address.	Body Represented.
Mr G. G. Esslemont, M.B.E., B.Sc., 41½ Union Street, Aberdeen Professor J. Hendrick, Marischal College, Aberdeen Mr J. F. Tocher, D.Sc., 41½ Union Street, Aberdeen	The North of Scotland College of Agriculture.
Mr John Forster, Mains of Larg, New Luce Mr W. Cassels Jack, Robiesland, Lanark	Animal Diseases Research Association.
Mr A. B. Fowler, B.Sc., Kirkhill, Ayr. Mr Norman C. Wright, M.A., Ph.D., Kirkhill, Ayr	The Hannah Dairy Research Institute.
Mr Robert Dickie, Knockenjig, Sanquhar Mrs Eadie, Hazelbank, Dunlop Mr George W. Lambie, Pilmuir, Newton Mearns Sir Hugh Shaw Stewart, Bart., C.B., Ardgowan, Inverkip	Co-opted Members.

Chairman—Mr Thomas Barr.

The following were the principal members of the staff :—

Secretary and Treasurer—Mr John Howie.
Superintendent—Mr William Stevenson, B.Sc., N.D.A., N.D.D.
Assistant Superintendent—Mr Percy H. Hart.

SCHEME OF OFFICIAL MILK RECORDS.

ADMINISTRATION.

In 1933, as in previous years, the scheme of official milk records was administered by the Association through local milk recording societies. The grant from the Treasury, obtained through the Department of Agriculture for Scotland, was continued in 1933 on the same conditions as in the previous year, though the amount authorised was reduced to £2504, compared with £2527 for 1932. Owing to the reduction in the Treasury grant the Association were unable to give grants to local societies for new members.

Grants were allocated to local societies on the following scale :—

1. Societies testing at intervals of not more than twenty-one days :—

(*a*) The hire of the necessary milk-testing appliances free of annual charge, the society to upkeep the apparatus in good condition.
(*b*) An annual grant of 9s. 6d. per member towards the cost of surprise check tests.

2. Societies testing at intervals of from twenty-two to twenty-eight days :—

(*a*) The hire of the necessary milk-testing appliances free of annual charge, the society to upkeep the apparatus in good condition.
(*b*) An annual grant of 8s. per member towards the cost of surprise check tests.

During the latter part of 1932 and the earlier months of 1933 every effort was made to obtain new members for local societies throughout the various dairying districts of Scotland, and 63 definite applications were received. But for various reasons, such as the continued acute depression in the industry, members disposing of their dairy herds or changing their farms, abortion in herds, &c., there were more than the usual number of resignations.

All the local milk recording societies which operated in 1932 continued in 1933, with the exception of the single-member society in Caithness, the member in question having removed to England. The Rhins of Galloway Society, with a view to economy in working, decided to extend the intervals between tests and have four large circuits instead of five smaller circuits. The North of Scotland Society, on the other hand, owing to an increase in membership, formed an additional recorder's circuit.

The number of recorders' circuits in 1933 was 39; the number of herds officially tested, 745; and the number of cows officially tested, 32,456, an increase of 7 herds and 1041 cows from the previous year, and the largest number of herds and of cows tested in the history of the Association. The position in 1933 was considered satisfactory under the conditions prevailing in the industry, when other milk recording organisations and the majority of agricultural societies or associations were unable to maintain their former membership.

The following is a list of the milk recording societies which operated in 1933, with the name and address of the Secretary of each society :—

Name of the Society.	Secretary.
Central and South Ayrshire (5 Circuits)	Mr E. A. Bell, M.A., B.Sc., 13 Alloway Street, Ayr.
Central Ayrshire No. 2 .	Mr James Caldwell, Moorfield, Kilmarnock.
Dumbartonshire . . .	Mr John Bilsland, Quay Place, Dumbarton.
Dumfriesshire (3 Circuits)	Mr Thomas Henderson, Solicitor, Lockerbie.
East Kilbride and District (2 Circuits)	Mr Arthur Gilmour, C.A., 23 Silvergrove Street, Glasgow.
East Lothian and Border	Mr James L. Nisbet, Easter Newton, Kirknewton.
East Stirlingshire . . .	Mr Robert M. Reid, The Glen Farm, Falkirk.
Fife (2 Circuits) . . .	Mr William Macniven, The Nook, Southerton, Kirkcaldy.
Highland	Mr J. M. Hunter, Queensgate, Inverness.
Kintyre	Mr Robert Young, Drum, Kilkenzie.
Lesmahagow	Mr Gavin Hamilton, British Linen Bank, Lesmahagow.
Lower Wigtownshire .	Mr William Christison, Barglass, Kirkinner.
North Ayrshire (John Speir) (3 Circuits)	Mr John W. Goudie, Union Bank, Kilmarnock.
North of Scotland (3 Circuits)	Mr James W. Mathewson, 13 Hutchison Terrace, Aberdeen.
Renfrew and Bute (2 Circuits)	Mr Thomas Hunter, Solicitor, 35 High Street, Paisley.
Renfrewshire (Upper Ward)	Mr William Henderson, Crookston, Newton Mearns.
Rhins of Galloway (4 Circuits)	Mr W. Brown Moir, 8 Bridge Street, Stranraer.
Stewartry of Kirkcudbright (5 Circuits)	Mr Patrick Gifford, Solicitor, Castle Douglas
West Lothian	Mr James Ogilvie, Dalmacoulter, Airdrie.

SEASON 1933.

The table on the following page shows for each society or circuit the number of herds, the number of cows tested, the average interval between the tests and the duration of the recording season :—

[TABLE

Name of the Society or Circuit.	No. of Herds.	No. of Cows Tested.	Average interval between Tests, in Days.	Duration of Recording Season, in Weeks.
Central and South Ayrshire—				
1. Ayr and District	19	750	24	52
2. Cumnock and District	19	591	23	52
3. Girvan and Maybole	18	813	23	52
4. Kilmarnock and Monkton	17	678	22	52
5. Mauchline and Drongan	18	593	23	52
6. Central Ayrshire No. 2	19	700	24	52
7. Dumbartonshire	21	759	27	52
Dumfriesshire—				
8. Mid Annandale	20	849	26	52
9. Upper Annandale	23	1012	27	52
10. Upper Nithsdale	20	945	26	52
East Kilbride and District—				
11. East Kilbride and District	24	791	27	52
12. Hamilton and District	18	630	23	52
13. East Lothian and Border	24	1013	28	52
14. East Stirlingshire	23	792	27	52
Fife—				
15. Dunfermline and Kirkcaldy	18	648	24	52
16. Cupar-Fife and Perth	18	570	24	52
17. Highland	16	584	25	52
18. Kintyre	13	553	28	52
19. Lesmahagow	20	648	26	52
20. Lower Wigtownshire	16	820	23	52
North Ayrshire (John Speir)—				
21. Fenwick	20	869	27	52
22. 'John Speir'	22	653	28	52
23. Stewarton and Montgomerie	21	835	27	52
North of Scotland—				
24. Forfarshire and Kincardineshire	21	690	28	52
25. Aberdeen and District No. 1	17	914	28	52
26. Aberdeen and District No. 2	15	451	28	52
Renfrew and Bute—				
27. Bute and Inverkip	23	692	28	52
28. Paisley and Kilmacolm	17	595	21	52
29. Renfrewshire (Upper Ward)	12	543	28	52
Rhins of Galloway—				
30. Kirkcolm and District	19	1385	26	52
31. Kirkmaiden and District	14	1287	28	52
32. Luce Valley	19	1253	28	52
33. Stranraer and District	18	1308	28	52
Stewartry of Kirkcudbright—				
34. Dalbeattie and New Abbey	19	912	24	52
35. Castle Douglas & New Galloway	21	1248	25	52
36. Castle Douglas and District	20	1009	26	52
37. Kirkcudbright and District	20	1179	26	52
38. Borgue, Twynholm & Gatehouse	20	1061	26	52
39. West Lothian	23	833	26	52
Total No.	745	32,456	...	...

DEFINITIONS.

The milk records compiled by the Association are records of the estimated quantity of milk produced by each cow in a separate lactation, and of the estimated percentage of milk fat contained in the milk. For convenience a gallon of milk is reckoned as 10 lb. A gallon of milk of average quality weighs almost exactly 10¼ lb. The following further particulars concerning each record were also given wherever possible:—

Name of cow, byre number and herd-book number.
Sire of cow and herd-book number of sire.
Dam of cow and herd-book number of dam.
Date of birth.
Date of calving preceding opening of record.
Number of weeks in milk.
Date of next calving after record closed.

The following particulars of the preceding record were appended to each record, where available:—

Date of calving preceding opening of record.
Quantity of milk in gallons.
Percentage of fat in milk.
Number of weeks in milk.

The milk yields were estimated in respect of quantity and milk-fat percentage from the results of systematic periodic tests by trained recorders approved by the Association. The recorders visited the farms for this purpose at intervals varying from twenty-one to twenty-eight days, and each day of visit was regarded as the middle day of the period covered by the visit. Milk records estimated in this way approximate closely to the actual milk yields.

METHOD OF RECORDING—OFFICIAL RECORDS.

A distinctive feature of milk recording in Scotland in 1933, as in former years, was that the official records were entirely the work of trained official recorders. Recorders had previously to undergo a special course of training in milk recording at the Dairy School for Scotland, or other approved College of Agriculture. Only candidates of good character and good general education were selected to attend these courses; and all recorders, before appointment, were approved by the Executive Committee of the Association.

Fuller details of the method of recording adopted will be found in the Association's annual report. The byre sheets were written out in duplicate. The principal copies were posted at regular intervals to the office of the Association, and the second copies left with the respective members. The recorder transferred the results from the extended byre sheets to the milk record book for the herd indelibly in ink, each cow being assigned a separate page, at the top of which full particulars of the cow were entered, including the indelible tattoo marks on the animal.

The byre sheets were carefully revised and corrected in the Association's office during the season, and a list of the necessary corrections sent to each recorder periodically to be entered in the record books.

Visits of inspection were made to each recorder and to the members of local societies at the different farms periodically throughout the year by members of the Association's staff, and reports thereon submitted to the Executive Committee. The Executive Committee reserved the right to withdraw approval of any recorder at any time, or to limit the period of service of any recorder with any particular society. Members of local societies refusing to observe any of the rules of the Association, or deemed to be guilty of conduct injurious to the true interests of milk recording, were liable to be temporarily or permanently suspended.

Another distinctive feature was the surprise check tests, the records of each herd being checked in this way about two times throughout the year. The recorder was instructed, by a letter from the superintendent on a date unknown to recorder and owner of herd, to remain at the same farm another day and make another complete twenty-four hours' test. The surprise test results were entered on special buff-coloured byre sheets, and in the record books in red ink immediately below the results of the regular test of the previous day. The buff byre sheets were posted to the Association's office with the other sheets, and any abnormal differences were immediately noted and were reported to the Executive Committee.

As a result of this system of surprise check tests, each page of the 1933 milk record books contains entries in red, comparison of which with the immediately preceding entries provides valuable evidence as to the genuineness of the milk records.

In addition to the surprise check tests made by the recorder, a number of independent surprise tests were made by the Association's staff in order to check the recorder's work.

All records were closed at the end of December, the current lactations being carried forward to the new books of the following year. Finally, summary sheets were written out in duplicate showing the total milk yields for each cow for the lactation or part lactation, with full particulars of the cow, dates of calving, &c. The principal copy of the summary sheet was posted to the Association's office with the record book, and the second copy left with the owner of the herd.

All record books and summary sheets were carefully revised, corrected in detail and initialled in the Association's office during the next few months, the record books being returned later to the respective members, and the summary sheets retained and bound for future reference.

The milk records were next classified into three groups for cows and heifers respectively on the following basis. Experience has confirmed the view that a very useful comparison is obtained by reckoning the yields at their estimated equivalent of milk of 1 per cent fat. Such a comparison takes into consideration both the quantity and the quality of the milk.

Cows with a milk record equivalent to not less than 2500 gallons at 1 per cent fat, and heifers with a milk record equivalent to not less than 2000 gallons at 1 per cent fat, were grouped into Class I. Cows and heifers with milk records of less than two-thirds of these amounts—viz., 1660 and 1330 gallons respectively—were grouped into Class III.

The following short table shows the corresponding values of these yields in fairly good milk of 3·5 per cent milk fat:—

Class.	Yield in Milk of 1 per cent Fat. (Gallons.)	Corresponding Yield in Milk of 3·5 per cent Fat. (Gallons.)
Cows in Class I. . .	Not less than 2500 .	714
Heifers in Class I. .	Not less than 2000 .	571
Cows in Class III. .	Less than 1660 . .	474
Heifers in Class III. .	Less than 1330 . .	380

All cows and heifers with milk yields falling between these limits would come into Class II. Such animals naturally claim less attention than the good milkers or the obviously unprofitable animals. It should be noted, however, that Class II. would include a certain number of unclassified yields, as there were a number of cases where, from various causes, the results of a whole normal lactation could not be obtained.

The Association will shortly publish an annual report giving fuller details of the work of the Association and of each local milk recording society during 1933. This report will include tables showing for each farm the number of cows and heifers tested and the number and percentage included in Classes I. and III. respectively. Each herd is included under the respective local society, but is represented only by an alphabetical letter, the owner being advised privately of the identity in the report of his own herd or herds. From these tables any member may see at a glance how his herd compares with other herds in the same or any other district, and the improvement in his own herd compared with previous years. The report will also show in tabular form the percentage of Class I. and Class III. animals of all animals tested under the Association's scheme during the year, and will thus afford a valuable indication of the progress in milk production generally.

An important feature of the Association's annual reports, from 1917 inclusive, is the register of good milking cows with the names and addresses of owners and full particulars of the milk records. This register includes only the records of animals with a milk yield equivalent to not less than 2800 gallons containing 1 per cent of milk fat in the case of a cow, and 2240 gallons containing 1 per cent of milk fat in the case of a heifer, and is further restricted to animals which completed their lactations before the end of the year and gave birth to another calf before 1st May 1934. Full particulars of each record are given, and all lists of records are submitted to the owners of the respective animals for revision before publication. The register is of great value to all interested in improved milk production and in the breeding and rearing of animals of the best milking strains, and is invaluable for reference.

It should always be kept in mind when making a comparison of cows in different herds or in different districts that the different methods of dairying practised have a considerable influence on the milk yields, and that therefore milk yields alone do not necessarily indicate the true relative inherent or hereditary milking qualities of the animal. But the authenticated milk records compiled by the Association are of inestimable value to breeders and owners of dairy cows if properly interpreted.

REVIEW OF 1933—OFFICIAL RECORDS.

Recording was carried on in 1933 by 39 local societies or circuits, comprising 745 members. The number of cows tested in 1933 was 32,456, compared with 31,415 in 1932, and was the largest number officially tested in the history of the Association.

The percentage of dairy cows officially recorded in Scotland compares favourably with that of other countries. With the exception of Denmark, where milk recording was introduced earlier than in Scotland and conditions prevail more favourable to movements on a co-operative basis, Scotland contains a higher proportion of officially recorded dairy cows than any other country.

During the year 5 recorders, for various reasons, terminated their engagements. The Executive Committee, however, in the same period approved of 14 applicants for the position of milk recorder, and were able to recommend a sufficient number of qualified recorders. Five women recorders were employed in 1933 and 39 men recorders. In this connection the Committee are indebted to the West of Scotland Agricultural College for giving special courses of instruction for milk recorders to meet the Association's requirements. Only one special course was required in 1933—namely, in December. Sixteen selected candidates attended the course, and 14 obtained the certificate.

The Executive Committee purchased the supplies of milk-testing apparatus, sulphuric acid and amylic alcohol for local societies, as in previous years.

The system of surprise check tests, introduced in 1920, was continued in 1933. The total number of check tests made by recorders during the season was 1027. In no instance in 1933 was the average milk yield for the herd more than 3 lb. milk daily less on the occasion of a check test as compared with the previous day. Only 2 herds showed an average of over 2 lb. less. In addition to the surprise tests arranged for and carried out by the recorders, the Assistant Superintendent made 43 special check tests of different herds. The results in most instances agreed very closely in regard both to average milk yields and fat percentages with those of the recorders' previous tests. Only 2 herds showed an average daily yield of over 2 lb. less on the occasion of a special check test, and no herd had an average of over 1 lb. more. With regard to average fat percentages, 2 herds showed an average fat percentage of over ·2 per cent lower, and 3 herds an average of over ·2 per cent higher. With the exception of 5 herds, the average fat percentages were all within ·2 of those obtained by the recorders at the previous tests.

With regard to the general conditions for milk production during 1933, the year began with wet, stormy and, at times, rather severe weather that gave no hint whatever of the singularly dry and genial conditions of the spring, summer and autumn that were to come. On the whole the weather during March was remarkably dry, mild and sunny. About the middle of April a short spell of frost and cold winds checked the growth of grass. Throughout May and June, however, occasional local showers of mild rain promoted the growth of crops and maintained pastures in a fresh condition. Rather high temperatures and excessively dry weather prevailed during July over most parts of the country. In eastern districts the drought continued during August and most of September, and harvest, which began exceptionally early, proceeded speedily under excellent conditions. In western districts wet and broken weather was general during most of August and some of the hay crop was damaged by the rain. Abnormally dry weather was experienced during the first three weeks of September, and fairly dry and mild conditions were repeated throughout the first three weeks of October, but moderately heavy showers of rain occurred during the last week or ten days of each of these months. The rain that fell greatly benefited pastures, but was not sufficient to promote the normal growth of root crops, and, for a time, turnips practically stopped growing.

Spring growth of the grass and clovers was fairly satisfactory, particularly in western districts, but during the early summer months the general absence of rain and the rather high temperatures caused the plants to mature exceptionally early, and the hay crop, in consequence, was lighter than usual. But in most parts of the country practically all of the hay was secured without a shower of rain, and the quality was better than it has been for several years. Growth of turnips and swedes was slow at the start, and resowing was necessary to some extent in many districts. At the beginning of July in the drier counties on light soils the crop was failing for want of moisture. During August and September swedes developed moderately well, but in eastern districts turnips grew very little and the crop became badly affected with mildew. On some farms finger-and-toe was prevalent. Rain that fell subsequently freshened the crop and swelled the roots. The average yield was below normal, and the keeping crop was considered to be very uncertain. For some milk producers the season was a difficult one; pastures were rather bare during the long dry summer, and extra hand-feeding was necessary to maintain the milk yield at the usual level.

Prices generally for milk and milk products relative to costs of production were even lower than in the immediately preceding years, which were far from satisfactory in this respect. Economic conditions did not encourage owners to produce the best possible milk yields from their herds. From the financial point of view the year was probably the worst of the series of thirteen poor years in succession, and the cumulative effect of the depression was being severely felt.

In the case of recorded herds, other conditions militated against a higher average yield. As in recent years, a considerable proportion of herds which had been recorded for a period of years were entirely dispersed, or for other reasons already referred to did not continue to be recorded, while a considerable number of 'new herds,' or herds tested for not more than three years, were included. The proportion of regular milk record herds was thereby correspondingly reduced.

The following table shows for each society or circuit the number and percentage of cows and heifers of each class in 1933, with a comparison of the average results from 1914 to 1933 inclusive:—

	Society or Circuit.	Cows and Heifers.				
		Number.			Per Cent.	
		Total.	Class I.	Class III.	Class I.	Class III.
	Central and South Ayrshire—					
1.	Ayr and District	750	617	9	85	1*
2.	Cumnock and District	591	523	...	90	...*
3.	Girvan and Maybole	813	700	...	86	...
4.	Kilmarnock and Monkton	678	607	1	90	...
5.	Mauchline and Drongan	593	458	2	89	...*
6.	Central Ayrshire No. 2	700	653	...	93	...
7.	Dumbartonshire	759	563	4	78	1*
	Dumfriesshire—					
8.	Mid Annandale	849	670	9	79	1
9.	Upper Annandale	1012	738	7	79	1*
10.	Upper Nithsdale	945	785	1	83	...
	East Kilbride and District—					
11.	East Kilbride and District	791	519	10	74	1*
12.	Hamilton and District	630	535	7	85	1
13.	East Lothian and Border	1013	732	13	74	1*
14.	East Stirlingshire	792	591	4	77	1*
	Fife—					
15.	Dunfermline and Kirkcaldy	648	489	7	75	1
16.	Cupar-Fife and Perth	570	393	13	69	2
17.	Highland	584	348	14	64	3*
18.	Kintyre	553	411	2	75	...*
19.	Lesmahagow	648	549	6	85	1
20.	Lower Wigtownshire	820	599	9	74	1*
	North Ayrshire (John Speir)—					
21.	Fenwick	869	698	4	80	...
22.	'John Speir'	653	509	4	78	1
23.	Stewarton and Montgomerie	835	661	3	81	...*
	North of Scotland—					
24.	Forfarshire and Kincardineshire	690	557	2	81	...*
25.	Aberdeen and District No. 1	914	584	15	65	2*
26.	Aberdeen and District No. 2	451	312	11	69	2
	Renfrew and Bute—					
27.	Bute and Inverkip	692	508	15	73	2
28.	Paisley and Kilmacolm	595	442	5	79	1*
29.	Renfrewshire (Upper Ward)	543	369	1	81	...*
	Rhins of Galloway—					
30.	Kirkcolm and District	1385	1005	19	73	1

Society or Circuit.	Cows and Heifers.				
	Number.			Per Cent.	
	Total.	Class I.	Class III.	Class I.	Class III.
31. Kirkmaiden and District	1287	902	22	70	2
32. Luce Valley	1253	687	35	58	3*
33. Stranraer and District	1308	937	21	72	2
Stewartry of Kirkcudbright—					
34. Dalbeattie and New Abbey	912	622	14	68	2
35. Castle Douglas and New Galloway	1248	842	20	70	2*
36. Castle Douglas and District	1009	590	31	58	3
37. Kirkcudbright and District	1179	853	24	72	2
38. Borgue, Twynholm and Gatehouse	1061	760	18	72	2
39. West Lothian	833	499	13	65	2*
Of all the cows and heifers tested in 1933	32,456	23,817	395	75	1¼
Comparisons with 1932	31,415	21,946	505	72½	1½
Comparison with 1931	30,576			72¼	1½
Comparison with 1930	30,720			70	1¼
Comparison with 1929	30,898			68	1¾
Comparison with 1928	30,293			66	2½
Comparison with 1927	29,459			65¾	2¾
Comparison with 1926	29,236			65½	2¾
Comparison with 1925	28,410			60	5
Comparison with 1924	27,957			65	3
Comparison with 1923	26,952			65	2
Comparison with 1922	27,275			63	2
Comparison with 1921	26,752			58¾	4
Comparison with 1920	24,191			55¼	3¼
Comparison with 1919	20,786			49½	4½
Comparison with 1918	17,827			49	5½
Comparison with 1917	19,564			50	4¾
Comparison with 1916	22,702			53¼	4¾
Comparison with 1915	26,572			46	6
Comparison with 1914	26,424			39½	9

* Excluding herds tested during only a part of the recording season—750 cows in all.

Reviewing the results of the 39 circuits as a whole, we find that of the total of 32,456 cows and heifers tested in 1933, excluding 750 animals in herds tested during only a part of the season, and therefore not classified, 23,817 were included in Class I. and only 395 in Class III. This is equivalent to 75 per cent in Class I. and 1¼ per cent in Class III. Thus, 75 per cent of all the cows and heifers tested gave a milk yield equivalent to not less than 714 gallons containing 3·5 per cent milk fat in the case of a cow and 571 gallons in the case of a heifer, while only 1½ per cent gave a milk yield equivalent to less than 474 gallons containing 3·5 per cent milk fat in the case of a cow and 380 gallons in the case of a heifer. In 1932, 72½ per cent were eligible for Class I., and 1½ per cent were included in Class III.

The average standard attained in 1933 was undoubtedly lowered by the inclusion of the considerable proportion of 'new' herds, and by the adverse trading conditions already referred to, yet it will be observed from the preceding table that the proportion of animals qualifying for inclusion in Class I. in 1933 is the highest reached since the commencement of official milk recording thirty years ago.

It will be observed also that the proportion of good milking or Class I. cows and heifers to the total animals tested has increased from 39½ per cent in 1914 (when the present basis of classification was adopted) to 75 per cent in 1933, while the proportion of Class III., or obviously unprofitable, animals has been reduced in the same period from 9 per cent to 1¼ per cent. These figures indicate a large increase in herd average milk yields, yet do not represent the full extent of the progress made since the introduction of milk recording in 1903. It is estimated that milk record herds generally are at the present time giving higher average yields than unrecorded herds to the extent of considerably over 200 gallons per cow per annum.

Improvement from milk recording is not confined to herds officially recorded in 1933. A very much larger number have been tested and recorded for longer or shorter periods since the Association's scheme of milk recording was introduced. And when we consider the spread or diffusion of the benefits arising directly or indirectly from milk recording, we find that these penetrate widely in various directions other than that of individual members of milk recording societies. For example, there is the effect on the remaining dairy herds of the country. The wide dissemination annually of milk record stock bulls and milk record cows for breeding purposes among untested herds alone must exercise an incalculable improving influence on a very large number of these herds. Such influence is increasing with the extension of the practice of using only milk record bulls in dairy herds.

There is also the powerful educational influence and force of example permeating and leavening the whole mass of dairy farmers, and gradually creating a new habit of thought in the realm of milk production. If a census could be taken in this connection it would probably be found that a very considerable proportion of herd owners outside the membership of milk recording societies are in one way or another testing and recording the milk yields of their herds who would never have done so had systematic or official milk recording not been in operation. The same consideration applies to the more enlightened methods of selecting, breeding and feeding on milk record lines which have been adopted in many herds not officially recorded.

There is another direction in which advantage from milk recording is penetrating widely beyond the ranks of milk recording societies. Increased efficiency in the production of milk lowers the cost to the urban populations, and some portion of the return from milk recording is handed on beyond the actual milk producers.

There remains a still wider aspect of the question. Large numbers of milk record bulls and young cows are exported annually, and go to maintain and improve the milking qualities of the dairy herds of the Empire.

The Association's activities are not confined to the official testing and recording of the individual milk yields, but are directed also to assisting the herd owners to improve their methods of production by means of the records obtained. The work is to some extent of an educative or advisory nature. Official recorders have to attend a course of instruction which includes the feeding and general management of the dairy herd, and are required to do all they can to interest and advise members in this connection. The Association have prepared and issued to all members a concise practical guide to feeding of dairy cows, containing a table of fifteen selected food mixtures adapted to different conditions, and recorders and central staff take every opportunity of assisting members to follow the instructions given therein.

SCHEME OF PRIVATE OR UNOFFICIAL MILK RECORDS.

The Association's scheme of private or unofficial milk records, inaugurated in 1924, was continued in 1933 on the same lines as in previous years. The chief objects are to establish milk recording on a wider and more popular basis, and to induce a greater number ultimately to adopt the system of official authenticated milk records.

Milk recording under this scheme was administered directly by the Association. The following inducements were offered to members :—

(*a*) The hire of a set of appliances for testing purposes free of annual charge, the member to upkeep the apparatus in good condition.

(*b*) Byre sheets and record books free of charge, with stamped addressed envelopes for return of byre sheets.

(*c*) All calculations in byre sheets and record books to be made in the Superintendent's office, and the sheets and record books to be returned to the herd owners duly extended and completed.
(*d*) The total charge on members to be limited to an annual subscription to the Association at the rate of 1s. per cow tested.

Twenty-one new members were enrolled for 1933. One of the members was transferred to the scheme of official recording. The total membership for 1933 was 117, with 2309 cows, an increase of 7 herds and 177 cows from the previous year. This new scheme of recording had in 1933 been the means of obtaining for official recording 41 new members of a very desirable type, which is one of the objects for which it was promoted.

There are several reasons why the membership under this scheme has not increased more rapidly. The better milking herds are gradually transferred to official records. Further transfers have been arranged for season 1934. At the other extremity there are a considerable proportion of very poor herds, the owners of which are evidently unduly discouraged by the low yields recorded, and apparently have not the mentality to appreciate the possibilities of effecting the much-needed improvement. Also, a number of members, after two or three years' experience, believe they can carry on recording on similar lines independently at smaller cost.

This scheme of unofficial recording is serving a useful purpose. For reasons already given, its effect must not be measured merely by the number of herds included in any particular year; account must be taken of its educational influence and propaganda value. Thus a considerable proportion of the members who have withdrawn, and meantime severed their connection with the Association, have acquired the milk-recording point of view, and ought ultimately to be found among members of milk recording societies. No fewer than 391 herd owners have been initiated in milk recording through its operation.

The following is a brief outline of the method of recording adopted:—

All cows in the herd yielding milk must be included in the record. Each cow must be clearly distinguished in the byre by a stall number on the wall. On the occasion of a test the cows must be milked in the same rotation evening and morning, and care must be taken that the milk of each cow for twenty-four hours, and for twenty-four hours only, is included in the test. The owner, or his agent, is required to weigh the milk of each cow evening and next morning by means of the spring balance and pail provided, once every twenty-one to twenty-eight days, and to enter the results and other necessary particulars in the byre sheet provided by the Association; and each byre sheet must be signed by the owner, or on his behalf, as correct in respect of all entries made. The byre sheet is sent by first post to the Superintendent, and calculated and extended by the Association's staff, and returned to the owner as soon as completed. A milk record book for each herd is written out in the Association's office. The record books are closed at the end of the recording season as at 30th November, and the results summarised and entered in special summary sheets. The record books and copies of the summary sheets, when completed and checked, are sent to the respective owners of the herds.

It must, of course, be clearly understood that the milk records compiled under this scheme are purely unofficial unauthenticated records, and have no connection with the official authenticated milk records of the Association. But from letters received and opinions expressed by members it is evident that very useful guidance may be obtained from the records.

PROSPECTS FOR 1934.

Propaganda on an extensive scale is carried through each year. Applications for membership, or for further particulars, are invited through press advertisements, articles, bills posted at auction marts, &c. All members of the Association, members of local milk recording societies, members under the scheme of unofficial records and milk recorders are requested individually to assist in obtaining new members for either scheme in their respective districts, and to send to the Superintendent the names and addresses of local dairy farmers likely to be interested. In this way a comprehensive propaganda list of possible new members is compiled. To each address on this list are sent circular letters and propaganda literature giving particulars of both systems of recording and enumerating the advantages to be obtained, and a form of application. Following on the distribution of literature, personal visits are made to most of the farms by the Association's staff, and the herd owners are classified into three groups according to the degree of probability of their becoming members. Wherever any particular interest is shown, the visit is repeated until a definite decision is reached. By this method, continued over a number of years, dairy farmers who were formerly quite indifferent have been enrolled as new members.

Similar efforts were made to obtain additional applications for membership of local societies in 1934. With the scheme of private or unofficial milk records in operation, it was possible to carry out propaganda work for both schemes simultaneously, and over 2000 circular and other letters, with propaganda literature, were distributed to dairy herd owners throughout Scotland. In addition, 1374 personal visits were made. But the severe depression in dairy farming which has existed now for thirteen years was evidently having a cumulative effect on herd owners, who were seeking to cut down expenditure in every possible direction, and there was the greatest difficulty in persuading any of them to adopt any new scheme entailing the slightest additional expenditure. The number of new members for official records for season 1934 obtained to date is 44, and a considerable number of prospective new members for the year following have also been obtained. If only conditions generally in the dairying industry were more normal, there would be every reason to expect a considerable increase in membership of milk recording societies in the immediate future.

All the local societies of 1933 have continued in 1934. The North of Scotland Society, as a temporary measure of economy in working, decided to discontinue for 1934 the part-time circuit which they set up in 1933 and to have two large circuits instead of three smaller circuits. The number of recorders' circuits in 1934 is reduced to 38, but many of these have a relatively large membership, and the total number of herds and cows officially tested will probably show an increase from the previous year.

The Committee are in a position to recommend a sufficient number of qualified recorders. All vacancies at the beginning of the year have been filled, and there remain a number of approved recorders on the waiting list. The Committee have arranged for supplies of sulphuric acid, amylic alcohol and milk-testing apparatus for local societies in 1934.

With regard to unofficial records, 16 new members have been enrolled. Four of the members have been transferred to the scheme of official recording for season 1934, making a total of 45 transferred. The total membership for unofficial recording at present is 105, with approximately 2072 cows.

GENERAL REVIEW.

It has been definitely ascertained that the cow of inherent good-milking character, properly fed in relation to daily milk yield, produces milk more cheaply than the cow, however fed, which gives only a moderate milk yield. The main object in systematic milk recording is to improve the dairy herds in regard to milk production; not necessarily to increase the total supply of milk, which should be governed by economic conditions, but to obtain more milk per cow, or the same quantity of milk from fewer cows. Milk recording is necessary also to maintain the improved herds at a satisfactory level of production.

The progressive dairy farmer seeks to know from reliable data as soon as possible which cows are up to a satisfactory standard, breeds his stock in a manner calculated to increase the number of good cows, and feeds his selected herd so that they may give the full yield of milk of which they are naturally capable without injury to health.

Milk recording enables a dairy farmer to progress by the three main avenues—(1) thorough weeding, (2) skilful breeding, (3) economic feeding. Each of these has been dealt with in more or less detail in previous reviews in the Association's annual reports. The remarkable improvement effected in milk record herds generally during the last twenty years has been largely due to the following out of these methods. How much of the progress made has been due to any one of them cannot be definitely determined. Probably more has been achieved by weeding than by breeding, owing to lack of a definite system up to the present of proving the good sires. It is certain, however, that a good deal of the improvement recorded has been the result of the improved methods of feeding dairy cows so generally adopted in more recent years.

The Association has long recognised the importance of proper feeding in this connection, and in 1926 they prepared and issued free to all members of milk recording societies in Scotland, and to prospective members, a special pamphlet on this subject in a concise and practical form showing a selection of specimen rations applicable to practically all cases. Copies have been given also to all new members since date of issue and to others on request. Probably some part of the general improvement in feeding practice that has taken place has been directly due to the issuing of these instructions, and the efforts of the milk recorders in interpreting them to the members. More could be accomplished in this direction. The science of cow feeding has been appreciably advanced in the interval; yet many good cows are not being properly fed.

The Association have been fortunate in obtaining for their forthcoming annual report an up-to-date article on this subject by Dr A. C. M'Candlish of the West of Scotland Agricultural College, the substance of which is given in the succeeding paragraphs. Dairy herd owners are urged not only to read this section carefully through, but to familiarise themselves with it and to apply these principles and methods in their daily feeding routine. It cannot be over-emphasised that milk is produced more economically from well-selected cows fed on properly balanced rations in relation to daily milk yields.

It is essential that the feeding stimulate production to the full economic capacity of the herd. If good pastures are available, the summer feeding is a simple matter. Winter feeding is generally a more difficult proposition, and it will receive greater attention here.

The feed of the cow is the greatest single item in the cost of production of milk—generally amounting to from 50 to 70 per cent of the total cost, therefore the feeding problem must be carefully considered. The higher the production of the cow, so long as she is not forced, the lower is the feed cost of milk production. This is due to the fact that the maintenance ration of any given cow is the same, no matter whether she is producing 2 gallons or 4 gallons daily. In each case the cost of the maintenance ration has to be added to the cost of the production ration. The production ration remains about the same per gallon for ordinary yields, and so, when the maintenance ration has to be charged against 2 gallons of milk, the total feed cost per gallon will be greater than where the cost of the maintenance ration is spread over 4 gallons.

The chief functions of the ration are to provide the cow with nutrients for the maintenance of her body and for the production of milk. It should be remembered, however, that in certain cases additional nutrients are required for other purposes—the building up of the unborn calf, the making of body fat in the case of lean cows and for growth in heifers.

The nutrients in the ration can be divided into two main groups—(1) the proteins, and (2) the carbohydrates and fats, or the energy-furnishing constituents. These must always be provided in quantities suited to the maintenance and production requirements of the cow. Vitamins and minerals need not be considered here, as they are generally present in sufficient quantities, provided the ration is otherwise suitable.

A good ration must be palatable so that the cow will be induced to consume all she requires for heavy milk production. It should also be bulky, provide some succulence and have a laxative effect. The bulky portion of the ration is best provided in the form of good hay, but, in addition, there should be other bulky constituents such as bruised oats and wheat bran in the concentrate allowance. Succulent feeds such as roots and silage are palatable and have a beneficial laxative action; they also provide part of the large amount of water required by the heavy-producing cow. Where succulent feeds are not available, feeds like wheat bran and linseed cake should be included in the ration.

Variety in the ration is essential. If sufficient variety be provided, there is little danger of the ration being deficient in minerals or vitamins, while a mixture of proteins from different sources is more valuable for milk production than the proteins supplied by any one plant. As a general rule a good winter ration will consist of a dry roughage such as hay, a succulent roughage such as roots or silage, and at least three concentrates.

Milk-producing cows must be considered as individuals and fed according to production. If all are fed alike only average production and less than average profits need be expected. In general practice all cows will be given about the same amount of roughage—what they will clean up in a reasonable time—and the concentrates will be fed according to production. Once the mixture of concentrates is made up, it is a simple matter to have a measure of known capacity with which these may be fed according to the production of the individuals within the herd.

The dairy cow provides a satisfactory means of disposing profitably of many home-grown crops, and some effort should be made to grow in suitable quantity the feeds she requires. Succulent feeds such as roots, silage or beet pulp should be provided, and wherever possible good hay. On the majority of farms some straw must be fed, but, if possible, at least half of the dry roughage allowance should consist of hay.

Home-grown cereals, oats and barley, form a valuable source of energy for the dairy cow and serve as an economical basis on which to found the concentrate allowance. The purchase of other energy-providing foods, such as maize, must be based on their relative prices as compared with the home-grown cereals.

It is seldom possible to have a sufficient supply of home-produced protein concentrates unless beans or peas are grown, and protein-rich feeds must generally be purchased. In purchasing feeds of this kind, such as soybean meal, cotton-seed cake, or earthnut cake, the main point to consider is the cost of the digestible crude protein which they provide. Care should also be taken to ensure that the purchased feed fits in with the other constituents of the ration.

The roughages provided should furnish enough nutrients for maintenance and the production of the first gallon of milk, and can be considered as the basal ration to which concentrates are added for further production. In the examples given the cow is considered as being of 9 cwt. live weight; for larger or smaller animals the allowance of roughage can be altered proportionately.

A good basal ration is :—

40 lb. Swedes.
16 lb. Hay.

As substitutes for 40 lb. of swedes, one of the following can be used :—

50 lb. Turnips or Cabbages.
40 lb. Mangolds.

20 lb. Sugar Beets or Potatoes.
25 lb. Silage.
6 lb. Dried Beet Pulp.

In ordinary circumstances the available supply of roots and hay will vary from time to time, and the basal ration must be altered to suit the conditions. It may be taken that 1 lb. of hay is the equivalent of 5 lb. of swedes, and the proportion of hay and roots may be varied accordingly. Thus a cow getting only 20 lb. of swedes will need 20 lb. of hay; while when 60 lb. swedes are given only 12 lb. of hay will be required. It is probable that the dry roughage allowance should never go below 12 lb. per head daily. Consequently, if the root allowance is increased beyond 60 lb., each additional 10 lb. can be taken as equal to 1 lb. of concentrates and the grain ration reduced accordingly.

Where no succulent feed is available a suitable grain mixture should be given, or ½ lb. to 1 lb. of treacle per day may be dissolved in water and sprinkled over the hay or concentrates.

Where straw has to be fed, additional concentrates must be given. For every 4 lb. of hay replaced by straw an additional ½ lb. of concentrates is needed. Thus when the 16 lb. of hay is entirely replaced by straw, 2 lb. of concentrates should be added to the daily production allowance.

The basal rations outlined provide nutrients for maintenance and the production of the first gallon of milk. They are also suitable for dry cows, as they allow some excess of nutrients for the production of body fat, though with cows in low condition some concentrates must be fed.

When the production of milk goes above 1 gallon daily, additional nutrients must be provided by means of concentrates. The most suitable concentrate mixture for any given set of conditions will be determined largely by the supply of home-grown feeds and the relative costs of purchased feeds. A very large number of mixtures could be given, but only a few will be used as examples. A concentrate mixture can consist of two or more feeds, but it is generally best for the sake of palatability and variety to have not less than three constituents present.

Draff can be claimed as either a roughage or a concentrate, as it possesses some of the properties of each. However, if it be remembered that 14 lb. of draff are sufficient for the production of 1 gallon of milk, it is easy to work it into the ration.

The feed mixtures given in Table I. contain three to five concentrates and are divided into two groups: those suitable where a succulent roughage such as roots or silage is fed, and those which can be used where no succulent roughage is available. The first gallon of milk is cared for by the basal ration, and the amount of the mixture required for each gallon of milk after the first gallon is 3½ lb. For example, a cow giving 3 gallons of milk per day should receive 7 lb. of concentrates.

Only a few of the concentrates are included here, but any one of them can generally be replaced by another of similar composition and character when prices indicate this to be desirable. Thus barley and rye are interchangeable, as are beans and maize-gluten feed.

Protein is the nutrient which is most generally deficient in dairy rations, and care should be taken to provide sufficient of it. With the roughages most generally available a concentrate mixture containing 15 to 20 per cent of digestible crude protein is necessary. The higher allowance of protein will generally give the greater milk production, and is to be recommended when feeds rich in protein are relatively cheap. On the other hand, when protein is costly it is more economical to feed mixtures containing about 15 per cent of digestible crude protein, as under such conditions milk production, though lower, will be obtained at a decreased feed cost per gallon.

Generally a fair amount of a grain mixture is made up at one time. Consequently the amounts of feed required for the mixtures are stated in hundredweights, and the proportions are such that each mixture is half a ton. Greater or smaller amounts can be mixed as required—in stones or pounds—so long as the proportions are maintained.

TABLE I.*

CONCENTRATE MIXTURES.

FEED WITH	SUCCULENCE.												NO SUCCULENCE.		
Mixture.	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P
Percentage of Digestible Crude Protein.	15	15	16	16	17	17	18	18	19	19	20	20	16	18	20
	Hundredweights.														
Barley	4	..	..	..	4	..	..	..	2	..	..	..	..	2	..
Maize	..	3	..	..	..	1	..	..	..	3	3	..	..	..	..
Oats	2	..	6	5	..	2	6	4	3	..	2	4	3	3	4
Wheat Bran	2	..	..	2	..	2	..	2	..	..	..	1	2	2	2
Brewers' Dried Grains	..	..	..	..	..	..	1	..	..	2	..	..	..	..	..
Palmnut Cake	..	2	..	..	..	..	..	..	..	..	2	..	..	..	..
Distillers' Dried Grains	..	3	..	1	3	..	..	..	2	..	..	2	2	..	1
Bean Meal	..	2	3	..	..	3	..	..	..	3	..	..	..	..	..
Linseed Cake	..	..	..	..	..	..	..	2	..	..	..	..	3	..	..
Undecorticated Earthnut Cake	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..
Decorticated Cotton Cake	..	..	..	..	..	2	..	..	2	..	..	..	..	..	..
Soybean Meal	..	..	..	2	..	..	3	2	..	..	..	2	..	..	1
Decorticated Earthnut Cake	2	..	..	..	..	..	..	..	1	2	3	1	..	3	2
Fish Meal	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..

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* This Table is taken from Bulletin No. 126 of the West of Scotland Agricultural College, which may be obtained from The Secretary, 6 Blythswood Square, Glasgow; price 1/-.

From the basal rations given and the concentrate mixtures in Table I., it is a simple matter to make up rations for dairy cows. A few examples will now be given for different yields of milk and varying conditions. In each case the cow is taken as about 9 cwt. live weight.

1. Daily yield 3 gallons. Hay and roots available.

40 lb. Swedes.
16 lb. Hay.
7 lb. Mixture E.

2. Daily yield 4 gallons. Hay, straw and beet pulp available.

6 lb. Dried Beet Pulp.
16 lb. Hay.
10½ lb. Mixture A.

3. Daily yield 3 gallons. Hay, but no succulent feed.

16 lb. Hay.
10½ lb. Mixture P.

4. Daily yield 4 gallons. Abundance of straw and roots.

60 lb. Mangolds.
16 lb. Straw.
10½ lb. Mixture F.

Many more examples could be given, but these should suffice.

Where only a few cows are kept it is generally difficult to purchase a large variety of feeds economically. To meet these conditions a few simple mixtures are given in Table II. In these, home-grown grain or maize is balanced with a single purchased concentrate. These mixtures are not ideal, but they are about the best obtainable where only one protein feed can be purchased. All would be improved by the inclusion of additional feeds.

The range in digestible crude protein content of these simple mixtures is from 15 to 20 per cent. It varies somewhat in each mixture, depending on whether the cereal used is barley, oats, rye, wheat or maize.

Rye is not fed in large quantities to dairy cows in Scotland, but it has been included here as it is used in some sections of the extreme west where only a few cows are kept.

[TABLE II.

TABLE II.

SIMPLE CONCENTRATE MIXTURES.

Cwts.	Cwts.	Digestible Crude Protein. Per Cent.
1 Cereal	2 Distillers' Dried Grain . . .	15-16
1 ,,	2 Bean Meal	15-17
1 ,,	1 Linseed Cake	15-17
2 ,,	1 Decorticated Earthnut Cake . .	18-20

Good pasture is the best feed during early summer, and so long as the pasture is abundant no other feed will be needed except in the case of very heavy-producing cows. The cows should be put to pasture gradually, as far as possible. The roots or silage allowance is cut down first, then the hay and finally the grain.

Though cows of average producing ability will be amply supplied with feed from the pasture alone, during the greater part of the summer as the season advances the forage provided by the pastures depreciates in both quantity and quality, and then additional feed must be supplied if the milk production is to be kept up. There are four general methods of attaining this end: (1) the provision of additional pasture, (2) the production of soiling crops, (3) the feeding of silage, and (4) the use of concentrates. The method employed will depend largely on conditions,- the system of cropping followed, and the stock other than dairy cows kept on the farm.

Thus earlier in the season cows giving 4 gallons of milk daily will manage without supplemental feeding; later it becomes necessary to give a supplement to 3-gallon cows, and still later on to cows giving only 2 gallons of milk daily.

In the latter part of the pasture season more protein is necessary in the supplement than was required early in summer. As a general rule the mixture fed should contain 15 per cent or more of digestible crude protein, and can be similar in nature to the mixtures recommended for winter feeding.

Where there is trouble from hoven or bloat with dairy cows on pasture, it is often advisable to give some supplement. Usually a small allowance of bruised oats or maize meal aids in preventing the onset of bloat, while a feed of hay, if the cows can be induced to eat it, also gives satisfactory results at times.

ANALYSES FOR MEMBERS DURING 1933.

By Dr J. F. TOCHER, Aberdeen, Analyst to the Society.

THE number of samples submitted by members for analysis during the year 1933 was 240, of which 41 were fertilisers, 37 were feeding-stuffs, 46 were milks and 47 were waters. There were 30 examinations for poisons and 39 miscellaneous samples. The following table (Table I.) shows the number and nature of the samples analysed during the past six years :—

TABLE I.

	1933	1932	1931	1930	1929	1928
Fertilisers . .	41	45	32	34	45	40
Feeding-stuffs .	37	32	43	27	34	56
Waters . . .	47	44	53	37	52	50
Other samples—						
Milks . . .	115	97	125	129	72	128
Poisons . .						
Miscellaneous .						
	240	218	253	227	203	274

FERTILISERS.

General.—The fertilisers examined may be classified as follows :—

TABLE II.

Compound fertilisers	17
Ground limes	8
Basic slags	6
Superphosphate	4
Bone meal	3
Potassic mineral phosphate	1
Potash salt	1
Marl	1
	41

The average composition of the compound fertilisers analysed was found to be 4·9 per cent nitrogen, 7·7 per cent soluble phosphoric acid, 3·3 per cent insoluble phosphoric acid and 7·7 per cent potash. The proportion of nitrogen in the compound fertilisers ranged from 2·1 per cent to 8 per cent. The variation in soluble phosphoric acid was from 6·7 per cent to 9·2 per cent, while that of insoluble phosphoric acid was from 0·9 per cent to 5·8 per cent. The proportion of potash varied from 4·2 per cent to 12·5 per cent. The following table (Table III.) shows the average results of the samples of compound fertilisers analysed during the year:—

TABLE III.

	Nitrogen.	Soluble phosphoric acid.	Insoluble phosphoric acid.	Potash.
Potato manure	5·32	7·32	2·26	9·24
Grain manure	4·60	9·15	3·72	4·68
Turnip manure	2·11	8·99	5·75	4·22
Grass manure	5·70	6·66	5·08	5·81
Grain and grass manure . .	4·10	8·45	4·37	6·40

The proportion of caustic lime in two of the samples of ground lime was below the average, being in each case just over 56 per cent. A sample of marl was found to contain over 88 per cent of calcium carbonate and only 6 per cent of insoluble silica and silicate. The name ‘marl’ is usually applied to material having a much higher proportion of insoluble silicate and therefore of less value as a fertiliser than the sample examined. Bone meal contains about 4 per cent of nitrogen and 20 per cent of phosphoric acid, equal to 43·7 per cent phosphate of lime. A sample sent in was found to contain 6·5 per cent of nitrogen, 16·6 per cent of phosphoric acid, equal to 36 per cent phosphate of lime, and 10 per cent of fat. The article was therefore not a bone meal. Bone and meat meals are on the market as feeding-stuffs, but this article was sold as a fertiliser. A sample of potash salt was found to contain 27·9 per cent of potash, a proportion somewhat below the average (30 per cent). The samples of basic slag were well ground and contained respectively 15·6 and 17·2 per cent of phosphoric acid.

FEEDING-STUFFS.

The feeding-stuffs examined included samples of dairy, pig and poultry mixtures, rice meal, bone and meat meal, sharps oat feed, oat husk meal and several samples of proprietary compounds. One of these samples had the following composition: oil, 17·4 per cent; albuminoids, 19·81 per cent; fibre, 5·75 per cent; ash, 9·08 per cent; moisture, 12·47 per cent; carbohydrates, &c., 35·49 per cent. This article was found to contain two substances apart from the feeding constituents. One substance was of a vegetable nature and known as foenugreek, a substance frequently added to condiments. The other substance, iodine, was present in an exceedingly minute amount—namely, not more than 20 grains per ton. The feeding value of the proprietary article is approximately equal to the feeding value of linseed cake. The present price of linseed cake is £8, 15s. per ton. The invoiced price of the article, I understand, is 58s. per cwt. or £58 per ton. I do not regard the article either as a valuable medicine or as an exceptionally good feeding-stuff. It has all the characters and properties of a condiment, and my experience is that condiments are of no value to live stock fed in the ordinary way with the feeding-stuffs available on the market or on the farm.

A sample of linseed cake was found to be unsatisfactory for feeding purposes because it contained several small stones, and, in addition, silica to the extent of 4·02 per cent. Two samples of linseed cake contained considerably more oil than is usually present (9 per cent), 13·2 per cent being found in one sample and 15·4 per cent in the other. All the samples of linseed cake were rather low in albuminoids, while one was below the average in both oil and albuminoids. The average for albuminoids is 29 per cent. A sample of wheat parings was also found to be below the average in oil and albuminoids. A consignment of rice meal was brownish in colour owing to the presence of a small quantity of a vegetable colouring matter of a harmless nature. A sample of oat husk meal contained 32·5 per cent of fibre, and had little feeding value. A sample of ensilage had proportions of the various constituents only slightly below the average of a dozen samples analysed recently in my laboratory.

The following table (Table IV.) shows the average composition of the feeding-stuffs analysed during 1933:—

TABLE IV.

	Oil.	Albuminoids.	Soluble carbohydrates.	Fibre.	Ash.	Moisture.
eed cake	10·46	25·68	..	..	..	..
y meal	6·56	21·72	..	..	..	..
y mixture	8·62	20·97	..	..	..	..
try meal	4·23	14·96	..	..	..	..
neal	4·85	16·06	..	3·78	..	..
ngs	2·20	12·81	..	1·67	1·40	..
lage	0·74	3·54	10·23	9·09	2·27	74·13
ps	..	..	..	2·80	..	..
feed	3·29	8·63	..	18·76	..	..
husk meal	0·31	1·15	..	32·54	..	..
il meal	0·98	24·78	..	..	3·09	..
meal	15·97	11·75	48·19	6·67	8·55	8·87
l	17·40	19·81	35·49	5·75	9·08	12·47
e and meat meal[1]	13·90	44·62	..	..	..	..

[1] Contained 11·98 per cent of phosphoric acid.

The proportion of oil in linseed cake varied from 7·7 to 15·4 per cent; albuminoids varied from 24·8 to 26·3 per cent. Oil in poultry meal varied from 3·8 to 4·7 per cent, and albuminoids from 12·4 to 16·6 per cent.

MILKS.

Forty-six samples of milk were analysed during the year. The number of samples found to be deficient was eight, being three fewer than during 1932. Three samples were found to be deficient in fat, four in solids-not-fat, and one sample in both fat and solids-not-fat when compared with the presumptive limits prescribed by the Ministry of Agriculture. The proportion of fat in the samples varied from 2·4 per cent to 5·5 per cent, while that of solids-not-fat ranged from 7·9 per cent to 9·3 per cent. These samples were witnessed samples, showing how inadequate the present law is in creating a presumption against the seller that milk has been watered if the proportion of solids-not-fat falls below 8·5 per cent.

The following table (Table V.) gives the results of analysis of samples of milk found to be deficient:—

TABLE V.

No.	Fat per cent.	Solids-not-fat, per cent.	No.	Fat per cent.	Solids-not-fat, per cent.
1	2·85	8·73	5	2·75	8·52
2	3·25	8·33	6	4·00	7·85
3	4·40	8·24	7	4·00	8·41
4	2·80	8·52	8	2·36	8·32

The following table (Table VI.) shows the nature of the distributions of fat and solids-not-fat in all the samples analysed for both butter fat and solids-not-fat:—

TABLE VI.

Butter-fat percentage.	Frequency.	Solids-not-fat percentage.	Frequency.
2 to 3	4	7·5 to 8	1
3 to 4	9	8 to 8·5	4
4 to 5	6	8·5 to 9	14
5 to 6	1	9 to 9·5	1
	20		20

WATERS.

Forty-seven samples of water were analysed during the year. Thirty-five were passed as fit for domestic use. Two samples were condemned owing to the presence of a relatively high proportion of dissolved lead. One sample, about which a complaint was made with respect to odour, was quite normal when received in the laboratory. I pointed out when reporting on this sample that a slight odour detected in water at the source may disappear entirely when the water is allowed to stand. In this case the odour was due to gaseous hydrogen sulphide, an offensive gas which rapidly disappears from a small sample owing to its volatile character. In plumbo-solvent waters a difficulty arises in finding a substitute for lead piping in the size required for the water supply at a farm. It is at present impossible to get coated or bitumen-lined piping of the size required and galvanised or cast iron piping is frequently unsuitable. I have drawn the attention of manufacturers to this matter in the hope that they may find piping resistant to the action of water in sizes suitable or economical for small water supplies.

POISONS.

Thirty examinations for poisons were made in feeding-stuffs and in the stomach contents of farm animals. Arsenic was detected in the stomach contents of a lamb. Lead in the metallic state was found to be present in five samples of linseed cake in proportions varying from 9·8 to 12·9 grains per pound. Castor bean was detected in samples of linseed cake, earthnut cake and sesame cake. The samples of linseed cake on hydrolysis yielded hydrocyanic acid in proportions ranging from 0·02 per cent to 0·045 per cent of the cake. A sample of lentil meal was examined for castor bean and other poisonous substances with entirely negative results. I am at present engaged in an investigation on behalf of the Society on the poisons found in feeding-stuffs. (See last paragraph—" Poisons in Feeding-Stuffs.") The death of one cow and the illness of five others after being fed with the meal was attributed to the presence of corncockle seed. The quantity of this weed seed was, however, found to be exceedingly small. A large sample was obtained in order to test the meal by conducting feeding experiments. The feeding-stuff containing a minute proportion of corncockle seed was given as part of a ration to a cow over a period of four days, but not the slightest sign of illness developed in the animal. I therefore reported that the lentil meal could not be the cause of illness or death of the animals. Two cases of mortality among ewes after administration of carbon tetrachloride were investigated. In both cases the carbon tetrachloride was pure and free from any poisonous substances. This liquid, which is frequently used as a specific against liver fluke, has been found to have a powerful action on the liver of small animals. Carbon tetrachloride has a toxic action when administered to the animal after fasting, and therefore acting on an empty alimentary canal. The toxic action would be more severe in animals of poor condition. I reported that the cause of death was poisoning by carbon tetrachloride more quickly brought about by starvation of the animals and probably accentuated by the prevailing cold weather.

MISCELLANEOUS.

A sample of mineral mixture consisted chiefly of calcium carbonate and sodium chloride, together with smaller amounts of magnesium carbonate and oxide of iron. The mixture was described as iodised. A very minute proportion of iodine, probably in the form of potassium iodide, was present. This mixture is supposed to supply mineral deficiencies in certain feeding-stuffs, but each mixture must be considered on its merits in connection with rations intended to be fed to live stock. A sample of paste used as a dressing for foot rot in sheep was found to contain copper sulphate, as the active ingredient, to the extent of 25 per cent. The following recipe will prove useful to flock masters:—

Copper Sulphate	25	per cent.
Prepared Chalk	20	,,
Oil	20	,,
Archangel Tar	35	,,
	100	,,

A sample of liquid manure contained 0·06 per cent of nitrogen, 0·002 per cent of phosphoric acid and 0·2 per cent of potash. The proportion of total solid matter was 5·6 per cent. The average proportions of the constituents of liquid manure are 0·2 per cent nitrogen, 0·3 per cent phosphoric acid and 0·46 per cent potash. The sample examined was therefore a poor sample of liquid manure. It was found to have been diluted with rain water escaping from a roof drain. Two samples of soil were found to possess a degree of acidity indicating that, in each case, dressings of lime would be beneficial. The 'lime requirements' were respectively 30 cwt. and 18 cwt. per acre for ordinary crops.

POISONS IN FEEDING-STUFFS.

At the request of the Directors of the Society, an investigation is being conducted by me on poisonous substances in feeding-stuffs. Two common causes occur, namely, (1) the presence of a foreign substance, castor seed, in feeding-stuffs such as linseed cake and cotton seed cake, and (2) the natural presence of a substance capable under certain conditions of forming hydrocyanic acid, commonly known as prussic acid, which is a poison well known in medicine and pharmacy. A number of samples of feeding-stuffs were recently found to contain fragments of castor seed, and several samples of linseed cake have been suspected causes of illness and death among live stock. Castor seed, being a foreign substance, is an adulterant under the Regulations of the Fertilisers and Feeding-Stuffs Act, and therefore should not be present in any feeding-stuff. The substance in linseed cake is, however, natural to linseed, and considerable difficulty has been experienced in determining the minimum amount likely to cause illness or death.

The object of the investigation is to find the minimum quantities of these poisons which will certainly cause illness or death or both. A number of very interesting results have been obtained, but the limits have not yet been accurately determined. Castor seed in varying proportions has been mixed in an ordinary ration and fed to bullocks. The stage reached is the proportion which will cause scouring. Smaller proportions may, however, produce the same result, and these smaller proportions are now being fed to the animals. The poisonous substance in linseed cake has also been fed in varying proportions in an ordinary ration to other animals (both pigs and bullocks) with no evident ill results. The quantities are now being increased.

This problem of poisons in feeding-stuffs is of great importance in agriculture, and the greatest care and caution must therefore be exercised in the conduct of the experiments and in stating the final results.

The investigation also includes the effect of salt on pigs and poultry. It can with certainty be stated that salt is a poison to poultry when fed to the extent of 5 per cent or over of the ration. It has, however, been found extremely difficult to induce pigs to consume a ration containing 11 per cent of salt. On the other hand, a ration containing small increasing amounts of salt, up to 7 per cent, can be fed to pigs without in the least affecting the health of the animals.

THE CEREAL AND OTHER CROPS OF SCOTLAND FOR 1933.

THE following comparison of the cereal and other crops of 1933 with those of the previous year has been prepared by the Secretary of the Society from answers to queries sent to leading agriculturists in different parts of the country.

The queries issued by the Secretary were in the following terms:—

1. What was the quantity, per imperial acre, and quality of grain and straw, as compared with last year, of the following crops? The quantity of each crop to be stated in bushels. What quantity of seed is generally sown per acre?—(1) Wheat, (2) Barley, (3) Oats.
2. Did the harvest begin at the usual time, or did it begin before or after the usual time? and if so, how long?
3. What was the quantity, per imperial acre, and quality of the hay crop, as compared with last year, both as regards ryegrass and clover respectively? The quantity to be stated in tons and cwts.
4. Was the meadow hay crop more or less productive than last year?
5. What was the yield of the potato crop, per imperial acre, as compared with last year? The quantity to be stated in tons and cwts. Was there any disease? and if so, to what extent, and when did it commence? Were any new varieties planted, and with what result?
6. What was the weight of the turnip crop, per imperial acre, and the quality, as compared with last year? The weight of the turnip crop to be stated in tons and cwts. How did the crop braird? Was more than one sowing required? and why?
7. Were the crops injured by insects? State the kinds of insects. Was the damage greater or less than usual?
8. Were the crops injured by weeds? State the kinds of weeds. Was the damage greater or less than usual?
9. Were the pastures during the season of average growth and quality with last year?
10. How did stock thrive on them?
11. Have cattle and sheep been free from disease?
12. What was the quality of the clip of wool, and was it over or under the average?

From the answers received, the following notes and statistics have been compiled :—

EDINBURGH DISTRICT.

MID-LOTHIAN. *Wheat*—52 bushels per acre; straw, 40 cwt.; seed sown, 3½ bushels. *Barley*—54 bushels per acre; straw, 20 cwt.; 3 bushels sown. *Oats*—62 bushels per acre; straw, 25 cwt.; seed sown, 4 bushels. *Harvest*—Began same time as last year. *Hay*—50 cwt. per acre of very good quality. *Meadow Hay*—Practically none grown. *Potatoes*—6½ tons per acre; a good deal of disease due to second growth, mostly seen after pitting. *Turnips*—18 tons per acre; affected by drought, but with mild winter, tubers increased in size, giving a better weight; no resowing. *Insects*—No damage. *Weeds*—No injury of any consequence. *Pastures*—Were seriously affected by drought. *Live Stock*—Throve wonderfully well. Cattle and sheep were free from disease. *Wool*—Average clip of good quality.

WEST LOTHIAN. *Wheat*—40 to 44 bushels per acre; straw good; grain of millable quality; seed sown, 4 bushels per acre broadcast and 3 to 3½ bushels drilled. *Barley*—44 to 48 bushels per acre; grain and straw of good quality; seed sown, 3½ to 4 bushels per acre. *Oats*—52 to 56 bushels per acre; grain and straw of good quality; seed sown, 6 bushels per acre broadcast and 5 bushels drilled. *Harvest*—Began fully a fortnight before usual time, and was one of the shortest harvests on record. *Hay*—1 ton 15 cwt. to 2 tons per acre; excellent quality; an ideal hay harvest. *Meadow Hay*—Not much grown. *Potatoes*—Much the same as last year; Earlies, 8 to 10 tons per acre; main crop, 10 tons per acre; disease very bad, especially in the Great Scot and Kerr's Pink varieties; worst for many years; no new varieties planted. *Turnips*—12 to 18 tons per acre; where sown early again a very good crop; later sown not so successful owing to dry weather, and suffered slightly from mildew; crop brairded well; very little resowing done. *Insects*—Practically no damage by insects; less than usual. *Weeds*—No injury to any great extent; damage less than usual; easily kept down owing to dry favourable weather. *Pastures*—Of less than average growth, owing to dry summer, but quality good. *Live Stock*—Throve well. Cattle and sheep comparatively free from disease. *Clip of Wool*—Full average clip of good quality.

EAST LOTHIAN (Upper). *Wheat*—48 to 50 bushels per acre; above an average; quality good for both grain and straw; seed sown, 4 bushels per acre; where dressed with 'Ceresan,' ½ bushel less. *Barley*—50 to 52 bushels per acre; also above an average; quality of grain much above an average; straw the best for some years; seed sown, 3 bushels per acre. *Oats*—62 to 64 bushels per acre; also above an average; quality of grain and straw extra good; seed sown, 4½ bushels per acre where dressed with 'Ceresan.' *Harvest*—Was about ten days earlier; secured under the best conditions and with the least expense. *Hay*—Quantity about an average, but suffered a little by drought; quality the best for years;

32 cwt. per acre. *Meadow Hay*—Little grown. *Potatoes*—Crop suffered by the long drought; some varieties ripened prematurely, and these were much below an average in tonnage; other varieties 8 tons per acre; blight affected the later varieties, causing considerable loss on some farms. *Turnips*—Much below an average; suffered from mildew on account of the drought; would be the smallest tonnage per acre for many years; yellow varieties on many farms were an entire failure; swedes would be one-third less than an average. *Insects*—Turnips were damaged by green-fly and later became affected by mildew. *Weeds*—No damage. *Pastures*—Suffered in the late summer from the long drought, and stock suffered through water supplies going dry. *Live Stock*—Throve well during the early season, but suffered later through the want of moisture. Cattle and sheep free from disease. *Clip of Wool*—About an average.

East Lothian (Lower). *Wheat*—40 to 64 bushels; average about 48 bushels per acre; an exceptionally good crop harvested in first-class order, with the result that it was all of millable quality; straw about 36 cwt. per acre; seed sown, 3 to 3½ bushels up to 4 bushels per acre in the later sowings. *Barley*—A very good crop; it was short in straw, and the weather being exceptionally sunny and dry, it was harvested in first-class condition, and a large proportion of the samples have turned out to be of good malting quality; it threshed well, and yields of 56 bushels per acre and over were quite common on good barley land, but the yield of straw was much below average; seed sown, 3 to 3½ bushels per acre. *Oats*—The least satisfactory of the cereals in 1933; owing to dry season the straw was shorter than usual, and the grain did not fill too well, with the result that it was light; thanks to the good weather, however, the crop was harvested in excellent condition; yield would be at least 8 bushels per acre under the average. *Harvest*—Was a record one for earliness and shortness. A start was made early in August, and as the crops were standing and the weather was very dry and sunny, the work was got through rapidly with a minimum of labour. *Hay*—Crop was of good quality, but a little average in weight; very few crops would reach 3 tons per acre, which is regarded in this district as a standard for a good crop; owing to the limited demand for hay and the unremunerative prices offered, a much smaller acreage is being grown. *Meadow Hay*—None grown. *Potatoes*—The crop was considerably lighter than last year, and contained a large proportion of tubers of seed size, for which, unfortunately, there was very little demand, even at a low price; the total yield per acre varied between 6 to 8 tons; owing to the drought, leaf curl was much more evident than usual, but 'Potato disease' was scarcely noticeable either on haulms when growing or on tubers at lifting time; Kerr's Pink, which is extensively grown, did not keep well in pit, and in many cases gave much trouble in dressing for the market; new varieties are constantly being tried, but there was nothing outstanding in the results last season. *Turnips*—A very light crop—10 to 15 tons per acre in October—but the fine back-end of the year and the exceptionally mild winter improved the crop considerably where it had not been ruined by the drought; the crop brairded all right as a rule, but the dry weather was adverse to the crop and favoured all kinds of insect pests, and in some cases finger-and-toe disease. *Insects*—Turnips suffered from 'cut' worms or surface caterpillars, which ate through the young plants shortly after they were singled, thus thinning out the crop; most kinds of insects were more abundant than usual, but there was no epidemic of any particular kind. *Weeds*—Crops were very free from weeds, with the exception of charlock and runches among corn; the weather made it a cleaning year, and weeds were kept very well in check among green crops. *Pastures*—Were all right as regards quality, but gave way early from want of rain, and were very bare during the later half of the season; the drought left scanty winter keep for sheep, but the mild winter went a long way to help out flock-masters. *Live Stock*—Throve only fairly well. Cattle and sheep free from disease. *Clip of Wool*—Quite an average.

BORDER DISTRICT.

BERWICKSHIRE (Merse). *Wheat*—The area sown, 4240 acres, some two and a half times greater than the increased acreage of 1932, can only be put down to the payment under the Wheat Act. Some of the earliest sowings were after lea, but right up to February, conditions favoured seeding as land was cleared and got ready. Seed sown, 4 bushels per acre, generally drilled. Braírds came away well and summer conditions were favourable for grain if not for straw. A yield of 42 bushels might well have been exceeded had the crop been confined to wheat lands. Quality good—all millable; natural weight, 62 lb.; straw short and fine; about 24 cwt. per acre. *Barley*—7152 acres shows a further reduction of 460 acres from 1932, and is the lowest on record. Land worked very nicely for seeding except at the finish, when it got hard and dry. Seed sown, 2½ to 3 bushels per acre. Brairds came quickly and regularly; growth was rapid, ears appearing before the end of June. With good conditions for ripening and harvest, grain was of high quality, yielding up to and over 48 bushels per acre. Natural weight, 54 lb., with occasional instances some pounds higher; straw short and fine, 22 cwt. per acre. *Oats*—Showed a drop of 2604 acres, as compared with an increase of 2200 in 1932. Sowings commenced very early, with the land in fine order. Late ploughed lea, however, got very hard and dry, the difference being very marked when brairds came away. Generally these came quickly, but failed to spread into a thick covering except on the best fields. Seed sown, from 4 to 6 bushels per acre. 'Ceresan' was freely used, but had not the same marked effect on brairds as in the previous year. Ears were showing by the end of June, and, ripening regularly, harvest was early. Grain fine quality; yield to 56 bushels per acre; weight, 46 lb. Straw very good fodder, but lacked bulk; about 21 cwt. per acre. With the very early harvest, shaken grain had time to spring on the stubbles. It was an eye-opener to most to see the amount of grain lost in a good season. *Harvest*—Began with August, quite a month earlier than usual. Except for an odd wet day, the crops were handled quickly and at little extra expense, many being finished within the four weeks. *Hay*—Cutting commenced very early in June; conditions were good, but the crop was under the average; about 26 cwt. per acre; fine quality, well mixed with clovers; aftermaths made slow growth. *Meadow Hay*—Was well got, but short of weight; 22 cwt. per acre. *Pototoes*—With an acreage of 2500, this crop showed a further increase of 200 acres. Planting was early, and the crop promised well all summer, with no disease showing until lifting time. An average crop of 6½ tons was harvested early and in good, dry and clean condition; did not keep too well, however, in pits. No new varieties. *Turnips*—A further slight reduction brought the acreage down to 16,797. Land worked easily, but was dry, and after the earlier sowings it was difficult to get a braird established. Some resowing had to be done, and while swedes made fair progress, yellows were very slow. Subsequently many fields were almost a failure from drought and disease. With an open autumn, swedes grew into a useful if blanky crop of 22 tons. *Insects*—Not to any extent. *Weeds*—Charlock was prevalent, and annual weeds of all kinds were troublesome in the turnip crop; the early season causing a pressure of work, it was difficult to get weeds kept in check. *Pastures*—All pastures were bare right through the season, and for a time were quite burnt up; there was no sort of roughage for autumn keep, but fields kept green and growing until late on. *Live Stock*—Cattle did not do very well, particularly young stock; keep was too short in the height of summer. Sheep stocks did very well; an average lambing, and lambs throve, a greater proportion going direct to the butcher. The autumn was very favourable for ewe stocks. Cattle and sheep free from disease. *Clip of Wool*—Good; rather over average.

Note.—1933 was an exceptionally dry year, particularly the first half, when only 7 inches of rain fell out of a total for the district of just over 20 inches. The watering of stock was a serious problem on many farms. The outstanding crops, if of less importance than most, were mangolds and sugar beet. The former was easily a record crop, and the latter lifted about 12 tons per acre with 17½ per cent of sugar content.

BERWICKSHIRE (Lammermoor). *Wheat*—Practically none grown, although a few farmers tried a field in order to obtain the wheat subsidy; the crops grown were wonderfully successful, a good yield of good quality being obtained. *Barley*—Less area being grown each year; an average yield of good quality grain; seed sown, 3 to 3½ bushels per acre. *Oats*—Rather a light crop compared with last year; straw in many cases short; yield, 36 to 40 bushels per acre; seed sown, 4 to 6 bushels per acre. *Harvest*—Was remarkably early, fully three weeks earlier than usual. *Hay*—A light crop of excellent quality; yield around 30 to 35 cwt. *Meadow Hay*—Also light crop; 25 cwt. *Potatoes*—An average yield, not so large as last year; little or no disease noticeable while growing; in many cases did not keep too well in the pits; no new varieties of note planted. *Turnips*—Crop very variable; taken all over, the crop was below the average; 16 to 17 tons per acre; brairded well, though some late-sown fields were affected by the dry weather, and re-sowing had to be done. *Insects*—Damage less than usual; turnip-fly rather troublesome in some cases. *Weeds*—None. The fine weather was very suitable for cleaning the land. *Pastures*—Not quite such a luxuriant growth as last year; on the lighter lands the dry weather took great effect and burned up the pastures.

Live Stock—Stock throve very well. Cattle and sheep, on the whole, were free from disease. *Clip of Wool*—Quality of wool good; clip rather under the average for weight.

ROXBURGHSHIRE. *Wheat*—Not much grown, but an increased acreage compared with last year. *Barley*—Only a small acreage grown; a good crop, 40 bushels per acre; quality above the average; seed sown, 3 bushels. *Oats*—Crop very variable; owing to dry summer, oats did not fill well; in many cases were rather badly attacked by leather-jackets. *Harvest*—Began a week earlier than usual, and owing to good weather was finished early; not much laid corn. *Hay*—A very light crop, but got in excellent order. *Meadow Hay*—A light crop, but got in excellent order in nearly all cases. *Potatoes*—A good crop; 10 to 12 tons per acre; a bigger percentage of seed than usual; a certain amount of disease. *Turnips*—Very variable; late sown turnips a fair crop; earlier sown suffered very badly from mildew and in many cases were entirely spoiled. *Insects*—Leather-jackets did a good deal of damage to the oat crop on some places, but sowing with Paris Green was generally successful in dealing with the pest. *Weeds*—Owing to the dry summer, weeds could be kept in check and did no damage. *Pastures*—Many pastures were badly droughted; others with a good sole of turf and on deeper land stood the drought well, and though pastures generally were rather bare, there was sufficient for stock. *Live Stock*—Where stock did not thrive the trouble could generally be traced to worm infestation. This is becoming an increasingly serious and difficult problem. Cattle and sheep were free from disease, apart from some contagious abortion and bovine tuberculosis. *Clip of Wool*—An average clip.

SELKIRKSHIRE. *Wheat*—None grown. *Barley*—Very little grown. *Oats*—Were sown about the end of March, and brairded well, but there was quite a lot of grub in lea oats. On light land, crops were badly burnt up by the long drought, but on heavier soils they finished a good crop; 40 to 50 bushels per acre; in higher and poorer districts from 20 to 35 bushels per acre; straw of very good quality. Seed sown, 5 to 6 bushels per acre: 1 bushel less per acre if dressed with 'Ceresan.' *Harvest*—Began a fortnight earlier than usual; crops were quickly handled and secured in excellent order, with a minimum of expense. *Hay*—Under the average for yield, but seldom got in better order; about 30 to 35 cwt. per acre. *Meadow Hay*—Light crop all over, but of excellent quality. *Potatoes*—Yield above the average; 8 to 10 tons per acre; disease was prevalent, especially in Kerr's Pink variety, which kept badly in pits, large quantities being unsaleable on account of dry-rot. *Turnips*—Were got in in good condition, but brairded very irregularly, especially 'The Bruce' disease-resisting yellow, which had to be resown in many cases. With the exceptionally dry summer, yellow turnips suffered badly, but swedes were a very good crop, having stood the drought better than yellows. *Insects*—Damage less than usual. *Weeds*—On account of the dry weather, weeds were easier kept in check. *Pastures*—On light land were badly burned up. *Live Stock*—Stock did not thrive so well as usual on account of shortage of grass. Cattle and sheep free from disease. *Clip of Wool*—Wool clip lighter than usual.

PEEBLESSHIRE. *Wheat*—Very little grown. *Barley*—Practically none grown. *Oats*—In many cases under an average for straw, although threshed well; from 48 to 56 bushels per acre in good districts; in the poorer districts and where thin on ground, 22 to 26 bushels per acre, and in some cases where badly burned up, not even that. Seed sown, 5 to 5½ bushels; if 'Ceresan' dressed, 4½ bushels per acre. *Harvest*—One of the earliest on record and one of the shortest, as the weather was exceptionally fine. *Hay*—Rye-grass hay not such a heavy crop as last year, but the quality very good; 30 to 36 cwt. per acre; on secondary land 20 cwt., and in some cases under the ton. *Meadow Hay*—Where saved in time much the same as last year, but in many cases the crop was not an average one, although quality excellent. *Potatoes*—In many cases under an average, and the crop irregular; free of disease, but great complaints of not keeping in pits, especially Kerr's Pink. *Turnips*—A most irregular crop; in some cases re-sowing had to be done; in late districts a very good crop and free of mildew; in early and dry districts mildew very bad; the crop, all over was under the average, and was deficient in feeding value. *Insects*—In some cases fly was pretty bad. *Weeds*—None. *Pastures*—Came away well, and in many parts of county were very good. In others the drought, which was exceptional, did much damage, and stock were very badly off. *Live Stock*—Except in the badly burned parts, the stock seemed to thrive well. Cattle and sheep free from disease. *Clip of Wool*—A good average clip and quality very fine.

DUMFRIES DISTRICT.

DUMFRIES (Annandale). *Wheat*—After a lapse of many years some enterprising farmers grew a few acres, and the results were very encouraging both as to quality and yield, but were largely due to the exceptionally fine spring and summer. Yield: grain, 60 bushels per acre; straw, 45 cwt. per acre; seed sown, 3½ bushels per acre. *Barley*—After a drop in sowings 1933 showed an increase over last year, mainly due to the prospects of a greater demand and consequent higher prices. All farmers who had the courage to sow a few acres were rewarded by a crop of extra good quality, and a price well above the average of the last five or six years. Yield: grain, 44 bushels per acre; straw, 25 cwt. per acre; seed sown, 3½ bushels per acre. *Oats*—The main cereal crop in Annandale appears to maintain about the same acreage year after year. Sowing began during the last week of February, and was general about the first week of March. Sowing and harrowing were carried through in record time, owing to the very fine weather and soil condition—an unusual combination in Annandale. The braird came away quickly, and the fine weather held right through the spring, with no rain during March or April. Sow-out oat crop was rather short in straw owing to the soil getting hard and crusted by the long spell of dry weather before the braird got well established. Lea oats, however, were not affected in this way, and the crop was one of the finest for many years. Average yield: grain, 40 bushels per acre; straw, 26 cwt. per acre; seed sown, 3½ to 5½ bushels per acre. *Harvest*—The summer and harvest of 1933 were the finest for a generation, and the whole grain crop was secured without a shower. Consequently the quality of both grain and straw was of the very best. Harvest began in the earlier districts about 28th July, was general about 6th August and finished about the 1st September—a fortnight earlier than last year. *Hay*—Time was very favourable, and a crop of excellent quality was secured. The yield was below the average owing to the very dry summer, but what was lacking in yield was made up for in quality. Yield, 27 cwt. per acre. *Meadow Hay*—Rather below the average as to yield, but here again the quality was all that could be desired. Yield, 24 cwt. per acre. *Potatoes*—A very good crop of excellent quality. A few cases of disease and blight were reported, but taken all over, the crop was well above the average. Yield, 7 tons per acre. *Turnips*—Sowing began in April, this being earlier than usual. Those sown later were checked by drought, and mildew started early in September with disastrous results. Consequently a crop below the average was the result, both as to yield and quality. Yield, 16 tons per acre. *Insects*—Damage by grub and other insects was very slight. *Weeds*—All fields were far freer from weeds than for many years. *Pastures*—In the early spring pastures were good, and all cattle were out at grass a fortnight earlier than the previous year. With no cold wet weather in May, young cattle and lambs did very well, and lambs and grass-fed cattle were on the market earlier than usual. Prices of lambs showed a marked increase over last year, but fat cattle prices gradually declined week by week. The grazing season was one of the best and longest on record. *Live Stock*—Stock of all kinds did very well right through. Cattle and sheep disease was very slight, except for grass sickness, which seems to be gaining ground rapidly in this district. *Clip of Wool*—An average clip, both in quality and quantity.

DUMFRIES (Nithsdale). *Wheat*—None grown. *Barley*—None grown. *Oats*—Very well got and very early, but ripened too quickly; ears not so well filled as last year; threshed lighter than last year. *Harvest*—About three weeks earlier. *Hay*—A very good crop and got in in splendid order; about the same bulk as last year. *Meadow Hay*—Slightly lighter than last year; also well got. *Potatoes*—About 5 tons per acre; a little lighter than last year; not much disease. *Turnips*—A very good crop except where affected by mildew; about 20 tons per acre; brairded well; more disease in turnips this year. *Insects*—None. *Weeds*—Very free from weeds. *Pastures*—Were not so ‘growthy’ as last year, but seemed to have more feeding value. *Live Stock*—Throve very well. Cattle and sheep free from disease. *Clip of Wool*—Good quality, but lighter than last year.

DUMFRIES (Eskdale). *Wheat*—None grown. *Barley*—None grown. *Oats*—Fairly good crop; on light land was short of straw owing to the dry weather; 33 to 37 bushels per acre; seed sown, about 6 bushels of heavy oats and less of potato oats; ‘Ceresan’ as a seed dressing was widely used again, and very satisfactory results were obtained. *Harvest*—Very early; about three weeks to a month earlier than last year. *Hay*—Crop light in most places, but all got in in first-rate condition and of excellent quality; about 30 to 33 cwt.

per acre. *Meadow Hay*—Also got in in excellent condition; about 26 cwt. per acre. *Potatoes*—A moderate crop with a good deal of disease; about 6 tons per acre; no new varieties planted. *Turnips*—Crop suffered from the dry weather, and hardly a field but was affected by mildew; brairded well and very little resowing required. *Insects*—Not much injury by insects; less than for some years. *Weeds*—No damage, as the weather during hoeing was very dry and killed the weeds well. *Pastures*—The growth was retarded by the dry weather, but the quality was good. *Live Stock*—Stock throve very well; even where fields were bare, stock did well. Cattle and sheep very free from disease of all kinds. *Clip of Wool*—The quality of wool about the average, but the clip did not weigh out well.

KIRKCUDBRIGHTSHIRE. *Wheat*—Only one or two farmers grew wheat, which harvested well, in ideal weather. *Barley*—None grown. *Oats*—A very good crop; perhaps not so long in straw as usual but thick; came away nicely at the beginning, but the long dry spell preceding harvest prevented the ears filling, and the crop did not thresh quite so well as last year; grain about 18 cwt., and straw 25 cwt., per acre. *Harvest*—Began exceptionally early—the first week in August—and was completed in record time on both early and late farms; the usual time for beginning round the shore is the third week in August. *Hay*—Crop was very good, and would average 2 tons per acre; clover was not so plentiful; seeds hay was cut a fortnight earlier than usual, the good weather tempting farmers to begin, and ryegrass ripened early. *Meadow Hay*—Much the same for bulk as last year, and harvested in fine condition; many years since the Stewartry stackyards held so much green hay. *Potatoes*—Crop was lighter than last year through lack of rain after midsummer; about 7 tons per acre; disease did not appear; no new varieties planted. *Turnips*—Came away splendidly, and never looked back until autumn, when mildew set in extensively; when rain came in November the leaves cleaned up and new ones appeared; 20 tons per acre; dry-rot and Rand in centre of the bulb were prevalent in October and November. *Insects*—No insect trouble. *Weeds*—Were very prevalent in turnips in July and August, as there was not the usual time between hay and harvest to give the turnip crop its last run through; same applied to field thistles. *Pastures*—Were good the first half of the season, and suffered from lack of rain in the latter half; the quality was affected in the autumn, and fields got very bare. *Live Stock*—Stock did well at the beginning, but from August onwards did not progress at the usual rate; after harvest, cattle and sheep seemed to make no further improvement in condition. Cattle and sheep have been healthy. *Clip of Wool*—Wool clip would be average.

WIGTOWNSHIRE. *Wheat*—Very little grown. *Barley*—Very little grown. *Oats*—Lea oats, 36 bushels per acre; oats after green crop, 44 bushels per acre; seed sown: potato oats, 5½ to 6 bushels where broadcasted, 3 to 5 bushels where drilled; large varieties, 7 to 8 bushels per acre; in some cases where 'Ceresan' was used with potato oats, 3 to 3½ bushels per acre did quite well. *Harvest*—Began twelve to fourteen days earlier than in 1932. A good breadth of lea oats had been early sown, and probably in many cases dressed with 'Ceresan.' Generally speaking, all oats got a good seed bed and a very dry summer. This accounted for the earliness of the harvest. Midway through the cutting there was a storm of wind and rain which laid a good deal of corn, but hardly to the same extent as last year. Owing to continued fine weather, oats were generally stacked in good order. On the other hand, owing probably to the abnormally dry summer, the quality was much poorer than a year ago. *Hay*—Crop was got in good condition; the quality was excellent and the quantity rather heavier than last year; about 35 cwt. per acre. *Meadow Hay*—Good in quality and quantity. *Potatoes*—Early potatoes were a light crop when digging started, but improved later to 7 or 8 tons per acre. Mostly Epicures were planted. Late potatoes were fairly free of disease and would weigh about the same as last year, 8 to 10 tons. *Turnips*—12 to 14 tons per acre. The braird was varied. On some farms turnips came away fast, but on black-top land, sown late, the braird was slow and thinning late. Not so much resowing was done as in previous year. With the dry summer mildew started, and continued with most serious effects. Finger-and-toe appeared on black-top land and did great damage. Altogether a very poor season for the turnip grower. *Insects*—The chief damage by insects was in turnips, 'fly' being very persistent on some farms. *Weeds*—Redshank was hardly so noticeable in turnips, unless where weeding had not been well done. Docks seem to get more prevalent each year, but thistles were well kept down. *Pastures*—In the west end of the county, pastures were about average, but in the Machars, owing to drought, they were more bare after harvest than usual. *Live Stock*—Stock, generally speaking, throve well, but on many farms there was a shortage of water for dairy cattle. Hoose is on the increase among calves, and there were a good many cases of grass sickness among horses. *Clip of Wool*—Quality and quantity about the same as usual.

GLASGOW DISTRICT.

AYRSHIRE. *Wheat*—43 bushels per acre—63 lb. per bushel; straw, 28 cwt. per acre; seed, 3½ bushels per acre; grain of moderate quality, but very little wheat grown in the district. *Barley*—33 bushels per acre—55 lb. per bushel; straw, 22 cwt. per acre; seed, 3½ bushels per acre; grain of fair quality; less than 20 acres grown in Ayrshire. *Oats*—46 bushels per acre—40 lb. per bushel; straw, 26 cwt. per acre; seed, 5½ to 7 bushels per acre; grain of fair quality. *Harvest*—Grain ripened exceptionally early; cutting commenced about two weeks before the usual time, and was finished by the time harvesting usually commences. *Hay*—30 cwt. per acre, of ryegrass; secured in excellent condition. *Meadow Hay*—Was less in bulk but superior in quality. *Potatoes*—6 tons 10 cwt. per acre; the crop was lifted in excellent condition, and the tubers were very good quality; there was practically no disease; a few new varieties were planted to test against the old variety, but none of them proved superior. *Turnips*—Generally the smallest crop for many years; 15 tons per acre was above the average in the district, and the roots were of poor quality; crop brairded well, but the drought checked growth, and the crop was disappointing. *Insects*—Not more than usual. *Weeds*—The dry season enabled weeds to be kept in check, and little damage was caused. *Pastures*—Started off well, and, where not over-stocked, continued sufficient, but the want of moisture prevented pastures becoming luxuriant. *Live Stock*—Stock throve well and made good progress, but in many cases were sold in the autumn at less than cost price in the spring. No disease amongst cattle and sheep. *Clip of Wool*—Quality good, and fleeces were heavier than average.

BUTE. *Wheat*—None grown. *Barley*—None grown. *Oats*—A good crop, but even more laid than last year; ripened too quick; not threshing well; a great deal of light grain; seed 5 to 6 bushels per acre, according to the variety. *Harvest*—Started cutting a little earlier than usual; began 10th August and finished on 5th September; got the worst weather of the whole year for the cutting; the crop was also badly laid and twisted, so had to cut it all with the reaper; this made the cutting a tedious business; weather cleared up the last day of the cutting, and carting-in was done without a stop; kept well in the stacks. *Hay*—A short crop; 1½ tons to the acre, but good quality. *Meadow Hay*—Very little grown; quality very good. *Potatoes*—Epicure potatoes earlier than last year; began digging on 5th June; a good crop, 7 tons per acre; Kerr's Pink a poor crop; dry weather affected them; not more than 4 tons per acre; no disease; did not hear of any new varieties. *Turnips*—A good crop; over 20 tons per acre; brairded well; no resowing; more disease among turnips this year. *Insects*—No injury by insects. *Weeds*—No injury from weeds; were easily kept down. *Pastures*—Were good; kept back by dry weather for a time, but quality improved when rain came. *Live Stock*—Stock did well on the pastures, which seemed to get just as much rain as they needed; this made the pastures better in the back end. Cattle and sheep free from disease. *Clip of Wool*—Quality good; about an average.

ARRAN. *Wheat*—None grown. *Barley*—None grown. *Oats*—A good crop; from 35 to 40 bushels per acre; on the high-lying districts the crop ripened before being properly filled, and consequently the quality and weight were poor; seed sown, about 4½ to 6 bushels. *Harvest*—Began two weeks earlier than usual and finished in record time. Ideal weather prevailed, and crops were never secured in better condition. *Hay*—A good crop; many farmers secured the crop for grass seed, of which there was an excellent sample, and for which good prices were received. *Meadow Hay*—Was not so heavy as last year, but the quality was excellent. *Potatoes*—An excellent crop; free from disease. There were many excellent samples of the newer varieties; the new variety 'Arran Pilot' appears to be taking a leading place. *Turnips*—Not grown to a great extent, but what were grown were a good crop; there was no disease, the dry season suiting this crop; at the Arran Root Show, tubers up to 15 and 20 lb. were exhibited. No resowing was necessary. *Insects*—No injury. *Weeds*—Were easily kept down. *Pastures*—Were good, the dry season again being an advantage. *Live Stock*—Stock throve well, and a good demand was maintained from the mainland for Arran stock. Cattle and sheep: no disease of any kind was reported. *Clip of Wool*—The wool clip was much the same and so unfortunately were the prices.

LANARKSHIRE (Upper Ward). *Wheat*—Only small quantities grown. *Barley*—Only small quantities grown. *Oats*—55 to 65 bushels per acre; a very good crop; quality of grain and straw excellent. *Harvest*—Was ten days earlier than usual; weather was very good, and crops were secured without any trouble. *Hay*—30 cwt. to 45 cwt. per acre; a little less than last year, but well secured; prices much better. *Meadow Hay*—A good crop; but a little less than last year. *Potatoes*—8 to 12 tons per acre; a little more than last year; no disease; no new varieties planted; prices very low. *Turnips*—20 to 25 tons per acre; a moderate crop; yellow turnips very bad with mildew; crop brairded well; no resowing. *Insects*—No damage. *Weeds*—Very few weeds owing to good weather. *Pastures*—Good, and lasted well into back-end of year. *Live Stock*—Stock throve well; prices very low; no margin left for summering. Cattle and sheep free from disease; one outbreak of anthrax. *Clip of Wool*—Full average clip.

LANARKSHIRE (Middle and Lower Ward). *Wheat*—38 to 40 bushels per acre; straw, 25 cwt. per acre; quality of grain and straw better than last year; seed: English, 3 bushels; Scotch, 3½ to 4 bushels. *Barley*—None grown. *Oats*—55 bushels per acre; straw, 20 to 25 cwt. per acre; grain and straw of first-class quality; seed, 5 to 6 bushels per acre, according to variety. *Harvest*—Began in the last week of July, which was fully a fortnight earlier than 1932. *Hay*—Ryegrass, 30 to 35 cwt. per acre; quality exceptional, but crop lighter than last year. *Meadow Hay*—40 cwt. per acre; exceptional crop and better than last year. *Potatoes*—8 to 10 tons per acre, which was slightly less than 1932; crop free from disease previous to lifting, but disease apparently spread in the pits; there was also a larger percentage of small potatoes than in 1932. *Turnips*—Poor crop on thin soil, but exceptionally good on the stronger land; 25 to 30 tons per acre on heavy land; crop brairded well in most districts, but mildew was prevalent later on. *Insects*—No loss from insects or other pests. *Weeds*—As a result of the very fine summer, it was easy to keep the crops free from weeds, and the soil was left in a very clean state after the removal of the crops. *Pastures*—Unless on thin sandy soil, where the grazing was burned up early in the season, the pastures were exceptionally good throughout the Middle Ward. *Live Stock*—Both cattle and sheep made rapid progress during the grazing season. Cattle and sheep were very free from disease, but owing to the warm weather maggots were troublesome. *Clip of Wool*—About an average.

RENFREWSHIRE. *Wheat*—A good crop of both grain and straw, and rather above average in quantity and quality; grain about 28 cwt. per acre; straw about 32 cwt. per acre; seed sown, 3 to 4 bushels per acre. *Barley*—None grown. *Oats*—A good crop, although ripened rather early on account of dry weather; on lighter land straw was short; grain about 22 cwt. per acre and straw about 25 cwt. per acre; seed sown, 4 to 6 bushels per acre. *Harvest*—About three weeks earlier than usual, and weather being very favourable, crops were secured in good condition. *Hay*—A good crop, and well secured; weather rather broken in later districts; quality on the whole good; yield about 30 to 40 cwt. per acre, according to district. *Meadow Hay*—Very little now grown. *Potatoes*—A good crop; slight disease amongst Second Earlies, but main crop was comparatively free. For larger cropping varieties, yield was about 8 to 12 tons per acre. Very favourable conditions for hoeing operations, consequently little trouble from annual weeds. *Turnips*—A fair crop, although not so good as previous year on account of dry weather; little resowing required; thinning and cleaning operations carried out under very favourable conditions. *Insects*—Little damage reported. *Weeds*—Little damage from weeds on account of the very favourable conditions for carrying out cleaning operations. *Pastures*—Suffered slightly on account of the very dry weather. *Live Stock*—On the whole, stock did well on pasture. Cattle and sheep generally were free from disease, although maggot-fly prevalent. *Clip of Wool*—About average in quantity and quality.

ARGYLLSHIRE (Lochgilphead). *Wheat*—None grown. *Barley*—None grown. *Oats*—Very disappointing; grain not more than 15 or 16 bushels; straw, 10 to 12 cwt. per acre; seed, 5 to 6 bushels per acre, according to variety. *Harvest*—Crops were mostly ripened by the first week in August—some three weeks earlier than usual; but this coincided with the beginning of a period of wet and stormy weather, and little or no progress could be made with cutting until the end of the month. After this, harvesting proceeded without interruption, but in the meantime, unfortunately, the crop had been very seriously and extensively damaged. *Hay*—Rather a light crop owing to deficiency of rain in the spring and early summer; it was well secured, and would average about the same as last year—1 ton per acre. *Meadow Hay*—A good crop and well secured. *Potatoes*—A poor crop; 3 to 4 tons per acre; they were fairly numerous and healthy, but did not come to any size; this did not apply to early varieties, of which there were good crops and of good quality. *Turnips*—Not so good as last year; about 15 tons per acre; brairded fairly well, but after that the dry weather went against them, and resowing had to be resorted to in some cases. *Insects*—No injury to any extent. *Weeds*—No damage to any extent; the dry summer made it easier than usual to keep them down. *Pastures*—Were exceptionally good; grass came away about three weeks earlier than usual, and lasted out well. *Live Stock*—Throve very well, on the whole, but lambs were not quite up to the usual standard as regards condition. Cattle and sheep were free from disease. *Clip of Wool*—Quite up to the average.

ARGYLLSHIRE (Kintyre). *Wheat*—Only a few acres grown; yield lighter than preceding year; milling quality rather inferior; grain utilised mostly for poultry food, and straw for thatching and bedding. *Barley*—Considerably more grown this year; practically none grown in 1932; yields good considering the dry season; 30 to 36 bushels per acre; quality of grain quite good; seed sown, 3 to 4 bushels per acre. *Oats*—Yields not so good as in previous year; crop ripened early, and the butt-ends of the sheaves were abnormally white; straw too dry and brittle and the grain not well filled; the crop, however, threshed better than was anticipated; average yield about 18 cwt. per acre of grain, with 20 to 23 cwt. of straw; maximum yield reported, 30 cwt. grain and 49 cwt. straw. This was a lea crop which had been liberally manured. General rate of seeding about 5 bushels per acre; general practice now is to treat the seed with 'Ceresan.' *Harvest*—Began earlier than usual; operations started in one instance during the second week of August, but generally harvest was a week to ten days earlier than normal. *Hay*—Crops good considering the dry nature of the late spring and early summer; some yields up to 2 tons per acre; average yield about 28 to 30 cwt.; quality good, crop being well harvested. *Meadow Hay*—Much the same as in previous years. *Potatoes*—Crops good and sound; yields much the same as in the preceding year, about 7 to 8 tons per acre; higher yields were in the neighbourhood of 10 to 12 tons; in one instance the yield reached a total of over 16½ tons grown on good potato soil out of a clover lea; 'Kerr's Pink' and 'Abundance' were the most widely grown main crop varieties; no new varieties grown to any appreciable extent. *Turnips*—Crop generally lighter than previous year, but occasional crops yielded up to 30 tons; average crop estimated at a little over 20 tons; yields lessened by disease—mildew, dry-rot, and finger-and-toe; crops brairded slowly owing to dry weather conditions; no resowing required. *Marrow Stem Kale*—Steadily becoming popular among the dairy farmers; best crop reached a yield of just over 30 tons per acre. *Insects*—No trouble reported from turnip-fly, but some damage done to the root crops by the root maggot; leather-jacket not in evidence in the cereal crops. *Weeds*—Generally speaking, a 'clean year' as regards weeds; redshank, however, rather abundant on some black soils where the turnip crop was light; charlock and runch vigorous on some of the lighter soils; docks prevalent on old pastures and meadow land. *Pastures*—Were fresh at the end of the winter, but became bare in the cold dry spring; recovery slow owing to dry summer conditions, but ultimately grass came away and gave good pasturage well into the autumn. *Live Stock*—Generally stock throve well on the grass; milk yields satisfactory. Cattle and sheep were relatively free from disease. *Clip of Wool*—About an average.

ARGYLLSHIRE (islands of Islay, Jura and Colonsay). *Wheat*—None grown. *Barley*—None grown. *Oats*—30 bushels per acre; 35 lb. per bushel; quantity sown, about 5 bushels per acre. *Harvest*—Much earlier than usual; began on 15th August and ended on 11th September; crops ripened quickly; weather was ideal for harvesting, and crops were secured in good order. *Hay*—Same as last year. *Meadow Hay*—Similar to last year. *Potatoes*—Not quite so good as last year; about 4 tons per acre; secured in good condition; no disease. *Turnips*—About 16 tons per acre; a good crop; only one sowing required. *Insects*—No injury. *Weeds*—No injury; the dry summer was favourable to the crops and inimical to weeds. *Pastures*—Were excellent all through the drought, as a strong sun favoured them. *Live Stock*—Throve excellently. Cattle and sheep free from disease. Fluke is almost a thing of the past in Islay and Jura. *Clip of Wool*—Fully up to average.

STIRLING DISTRICT.

DUMBARTONSHIRE (Upper). *Wheat*—None grown. *Barley*—None grown. *Oats*—Not quite so good a crop as last year; quality also not so good, as there was a lot of lying corn due to wind and rain. *Harvest*—Began fully a fortnight before the usual time. *Hay*—Ryegrass hay was a lighter crop than last year, but was never got in better order. *Meadow Hay*—Was a very good crop, and was mostly got in good condition. *Potatoes*—Were a lighter crop than last year; about 5 tons per acre; very little disease. *Turnips*—Crop was not so good as last year; about 18 tons per acre; brairded well; no resowing. *Insects*—No injury. *Weeds*—Little trouble with weeds. *Pastures*—Were very good, came early and lasted well. *Live Stock*—Stock throve very well, except that lambs took a set-back in June and July despite the fact that there was plenty of grass. Cattle and sheep free from disease. *Clip of Wool*—Wool was an average clip.

DUMBARTONSHIRE (Lower). *Wheat*—The weather during the summer was exceptionally favourable for the wheat crop, with the result that both quantity and quality were above the average; yield about 44 bushels per acre; weight per bushel, 61 lb.; straw, 30 cwt.; seed sown, 4½ bushels per acre. *Barley*—None grown. *Oats*—Oats did very well except on light dry soil, where crops ripened too quickly; quality was exceptionally good; yield, 55 bushels per acre; weight per bushel, 42 lb.; straw, 25 cwt. per acre; seed sown, 5½ to 6 bushels per acre. *Harvest*—Generally was fifteen days earlier than usual; probably the earliest during the last half century. *Hay*—Ryegrass and clover hay bulked much the same as last year and the quality was excellent; yield, 36 cwt. per acre. *Meadow Hay*—Was not so bulky as the previous year, but the quality was good. *Potatoes*—Yield about 7 tons per acre, about 1 ton less than 1932; there was little or no blight in the crop; no new varieties planted. *Turnips*—About 16 tons per acre; quality was adversely affected by mildew; yield, 2 tons less per acre than last year; crop brairded quickly and regularly. *Insects*—There was very little evidence of damage to any crop. *Weeds*—Favourable weather enabled a rapid and thorough cleaning of the root crops; charlock was troublesome in the oat crop. *Pastures*—Were good during the summer, and lasted well into the late autumn. *Live Stock*—Both cattle and sheep did well during the summer, and foggage lambs fattened well in the autumn. Cattle and sheep were generally healthy; maggots, however, were troublesome amongst sheep, and back calving cows were subject to mastitis. *Clip of Wool*—The quality of wool was good, but the clip was rather under average.

STIRLINGSHIRE (West). *Wheat*—Yield about 15 cwt. per acre; good quality grain and straw; seed sown, about 4 bushels per acre. *Barley*—None grown. *Oats*—A good crop; threshed well, but hardly up to last year's exceptional yield; straw hardly so plentiful, but fine quality; grain about 16 cwt. per acre; straw, 20 to 24 cwt.; seed, 5 to 7 bushels. *Harvest*—Began exceptionally early, nearly a month before usual time. *Hay*—Quantity a shade less than last year; quality extra fine. *Meadow Hay*—Average crop. *Potatoes*—Rather better than last year, 7 to 10 tons, but proportion of ware a little low; no disease, and no new varieties planted. *Turnips*—A good average crop—about 20 tons per acre—but did not keep too well; no resowing required; *Insects*—Some damage to oats by grub. *Weeds*—Not troublesome; some redshank among turnips. *Pastures*—Good. *Live Stock*—Throve well. Cattle and sheep, on the whole, free from disease; some summer mastitis in cattle. *Clip of Wool*—Average clip.

STIRLINGSHIRE (East). *Wheat*—About 44 bushels per acre, good quality; straw about 20 cwt. per acre. *Barley*—About 32 bushels per acre; quality good; straw about 18 cwt. per acre. *Oats*—Crop shorter on dry land; about 50 bushels per acre; good quality; straw about 18 cwt. per acre. *Harvest*—Began about three weeks earlier than usual, and finished about the same; crops secured in good order. *Hay*—A fair crop and well got. *Meadow Hay*—Fair crop and well secured. *Potatoes*—An average crop on good land, but a medium crop on poor land. *Turnips*—Yellows a poor crop, owing to dry season and mildew; swedes an average crop, improved greatly during September and October; brairded well; no second sowing. *Insects*—About the usual. *Weeds*—About the usual. *Pastures*—Good on clay soil, rather poor on light soil. *Live Stock*—Throve quite well on good land. Cattle and sheep were free from disease. *Clip of Wool*—Average clip.

CLACKMANNANSHIRE. *Wheat*—A very good crop; brairded well and ripened evenly; 38 to 43 bushels per acre; straw was good; 28 to 32 cwt.; seed 4 to 5 bushels per acre; more white wheat is now being sown. *Barley*—None grown owing to lack of demand and poor price. *Oats*—A good crop, ripened well; colour good; harvested in excellent condition; 35 to 40 bushels per acre; average weight 40 to 43 lb. per bushel. *Harvest*—Began about the usual time. *Hay*—2 tons to 2 tons 5 cwt.; a good crop and secured in excellent condition. *Meadow Hay*—A good crop and well got. *Potatoes*—6 to 8 tons per acre; 2 to 3 tons less per acre than last year; no disease; Kerr's Pink and Golden Wonders, 4 to 5 tons; quality excellent, kept very well in the pits; no early varieties planted. *Turnips*—25 to 30 tons; the early sown brairded well; those sown later brairded slowly owing to dry weather; some second sowing in places; very little finger-and-toe. *Insects*—Very little damage by fly. *Weeds*—Very little damage by weeds. *Pastures*—Good. *Live Stock*—Did well; cows milked well on the grass. Cattle and sheep were free from disease. *Clip of Wool*—A fair average.

PERTHSHIRE (Western). *Wheat*—A much larger break sown, and was the best crop of the season; 40 to 42 bushels per acre, and harvested in extra good condition. *Barley*—Very little grown. *Oats*—A good crop on back-lying lands, but others were much under average; having ripened rather quickly, there was a lot of light grain; yield of grain under average; 4 to 5 quarters per acre. *Harvest*—The earliest for many years; started 7th August and finished 30th August. *Hay*—On carse land Timothy was a very good crop, 3 tons per acre; on dry fields under an average, 1 to 1½ tons; all got in grand order. *Meadow Hay*—Also under average. *Potatoes*—Mostly under average; grew rather quickly, and therefore there was a larger proportion of seed size; yield, 5 to 6 tons per acre; very little disease; lifted in splendid condition. *Turnips*—Came very early to the hoe, and did well until a long spell of dry weather set in, when they got badly affected with mildew; they improved, however, in the back-end, and turned out much better than expected; yield, yellows 15 to 18 tons and swedes 20 to 25 tons per acre; free from disease. *Insects*—No damage by insects. *Weeds*—With fine dry weather weeds were easily kept down. *Pastures*—Grass was poor on dry land, but on good deep land it was very good and of splendid quality. *Live Stock*—Stock did well. Cattle and sheep were free from disease. *Clip of Wool*—A good average clip.

PERTH DISTRICT.

FIFESHIRE (Middle and Eastern). *Wheat*—Above the average, the best wheat crop for many years; 40 bushels per acre, and in many districts more; straw, 30 cwt.; both grain and straw of excellent quality; seed sown, 3 to 4 bushels. *Barley*—Above an average crop; 40 to 48 bushels per acre; excellent quality; much smaller acreage grown than in the past owing to poor price obtained; seed sown, 3½ bushels. *Oats*—Not more than an average, but excellent quality; from 50 to 60 bushels per acre; straw rather short in many places, but also of excellent quality; seed sown, 4 to 6 bushels. *Harvest*—Started 1st of August, about fourteen days before usual time; almost the whole of the grain was in the stack in August, the earliest harvest for very many years, and one of the best. *Hay*—Slightly under the average for quantity, but of excellent quality; about 35 cwt. per acre; secured in fine condition. *Meadow Hay*—None grown. *Potatoes*—Yield less than average crop, about 7 tons per acre; Kerr's Pink, of which there was a big acreage, did badly; the crop was small, and there was a large proportion diseased in the pits; other varieties kept fairly well. *Turnips*—Crop variable, below average; swedes were very badly mildewed, and looked a very small crop at one time, but improved wonderfully well when rain came and eventually finished up quite a fair crop; about 20 tons per acre; yellow turnips almost a failure, less than half a crop. *Insects*—Damage not more than usual. *Weeds*—Usual weeds; in some parts thistles were much in evidence after the rain. *Pastures*—Suffered from drought, and were below average, but the quality was good. *Live Stock*—Throve very well where grass was available, but large numbers of stock of all kinds suffered from lack of pasture. Cattle and sheep were free from disease. *Clip of Wool*—An average clip. *Sugar Beet*—1990 acres of sugar beet were grown for the Cupar factory in 1933, producing 19,128 tons, or an average of 9·6 tons per acre; average sugar content 17·2, the highest sugar content yet recorded at Cupar factory. Price paid the farmer was 42s. per ton, delivered at the factory. 1933 season was the best year the farmers have had with growing sugar beets, best crops and best returns; the warm early season ripened the beets early and allowed the farmers to harvest them early in time to sow wheat afterwards.

FIFESHIRE (Western). *Wheat*—Good quality and well secured; yield slightly below the average, 32 to 36 bushels per acre; the weight per bushel will be below standard weight; straw good quality, with lighter yields; seeding, 3½ to 4 bushels per acre. *Barley*—Good quality, and with the favourable season well ripened, yielding 30 to 34 bushels per acre; barley being grown only on the best land lying near the sea; straw of lighter yield, but of good quality; seeding, 3 to 4 bushels per acre. *Oats*—Were of very good quality and well secured, yielding 40 to 48 bushels per acre; the standard weight was below the average, due to premature ripening; crop, where the cutting was delayed, suffered damage, the straw being broken by high winds, with consequent loss of grain; straw of best quality and average weight; seeding, 5 to 6 bushels per acre. *Harvest*—With the continued dry weather and bright sunshine of the summer, the harvest of 1933 will be remembered as one of the earliest for many years. It commenced at the beginning of August and was general by the third week—two or three weeks earlier than usual. *Hay*—Ryegrass and clover hay were secured in good order, but in general would be lighter than for some years; general average, 35 cwt. to 45 cwt. per acre. *Meadow Hay*—Not grown to any great extent; average yields. *Potatoes*—A good crop of 5 to 7 tons per acre, slightly below last year. At time of lifting the tubers appeared free from disease, especially with Kerr's Pink, but after being pitted in splendid order disease became prevalent. *Turnips*—An average yield of swedes, 15 to 20 tons on the best land; yellows below the average. The dry land caused delay in brairding, and, owing to continued drought, the tubers had not sufficient moisture to swell them; with the mild autumn the swede crop was able to increase in weight before lifting. No resowing. *Insects*—Crops free from insect pests. *Weeds*—Crops free from weeds; with the favourable dry season many fields, more especially on wet land, were satisfactorily cleaned; the early harvest enabled land to be cleaned on the surface before ploughing. *Pastures*—Dry during summer, but sufficient for requirements; grass of good feeding quality well into the autumn. *Live Stock*—Throve well on pastures. Cattle and sheep free from disease. *Clip of Wool*—An average clip of good quality.

PERTHSHIRE (Eastern). *Wheat*—Considerably more wheat grown; an average crop, secured in excellent condition; about 40 bushels per acre; seed, 4 to 5 bushels per acre. *Barley*—A fair crop of good quality; 36 to 40 bushels per acre; seed, 3 to 4 bushels per acre. *Oats*—Rather a light crop, owing to the drought, but secured in first-class condition; 50 bushels per acre; on higher and lighter land it was a poor crop, 26 to 30 bushels per acre; seed, 4 to 6 bushels per acre. *Harvest*—Began a fortnight earlier than last year; started 27th July, finished 21st August; weather ideal. *Hay*—An average crop, secured in excellent condition; first-class quality; 26 to 35 cwt. per acre. *Meadow Hay*—Very little grown. *Potatoes*—A lighter crop than last year; about 7 to 8 tons per acre; some disease amongst Kerr's Pink at lifting time, which got worse in the pits; no new varieties. *Turnips*—Swedes were under an average crop, but grew well, owing to the fine weather, in October and November; about 20 to 25 tons per acre; yellow turnips were a poor crop; brairded well, but got checked in July by the excessively hot weather; some mildew among both swedes and yellows. *Insects*—No damage by insects. *Weeds*—No damage; owing to the fine season green crops were more easily kept clean. *Pastures*—Were fairly good till about July, but got very bare during August and September. *Live Stock*—Throve quite well early in the season, but did not do well after July. Cattle and sheep free from disease. *Clip of Wool*—Average clip.

PERTHSHIRE (Central). *Wheat*—The acreage sown was fully in excess of that of last year; about 45 bushels per acre; secured in excellent condition; the grain was well filled, but on account of the dry season the straw on some farms was short in the stalk. *Barley*—Fully more barley also was sown; harvested in very fine condition; about 40 bushels per acre, weighing 52 lb. per bushel. *Oats*—A smaller acreage was sown than last year, this being accounted for by the low prices got for the grain. *Harvest*—Began about the end of August with barley, followed by oats and wheat; the whole harvest was finished by the third week of September. *Hay*—On many farms the hay crop was under the average yield; it was got in good condition; about 1½ tons per acre. *Meadow Hay*—Was secured in very fine order, and the yield was up to the average in quantity and quality. *Potatoes*—The acreage planted was fully more than last year; the yield was large, and the quality, on the whole, good; there was no disease; average yield per acre 8¼ tons. *Turnips*—Yellow turnips and swedes were under the average; from 7 to 10 tons per acre; some finger-and-toe and mildew; very little resowing. *Insects*—Very little damage was done by grub or wireworm, or by turnip-fly. *Weeds*—Few crops were injured by weeds. *Pastures*—Some pastures suffered from the want of moisture, and turned brown in colour. *Live Stock*—During the month of July stock on pastures did not thrive too well on the dry grass. Cattle and sheep free from disease. *Clip of Wool*—Up to the average, and the quality good.

PERTHSHIRE (Highland). *Wheat*—None grown. *Barley*—Very little grown, only small patches for stock; weight light. *Oats*—Very good crop of straw and grain; natural weight about 42 lb. per bushel; an average of 6 bushels sown per acre. *Harvest*—Began early in August, at least a fortnight sooner than usual, and was completed in most cases by the second week of September. *Hay*—A fair crop and well secured; 30 cwt. per acre. *Meadow Hay*—An average crop and well secured. *Potatoes*—A fair crop, exceptionally well got; about 6 tons per acre. *Turnips*—Owing to exceptionally dry summer, yield lighter than usual; about 17 tons per acre; crop brairded well and little second sowing required, but ultimately affected by mildew. *Insects*—No damage by insects. *Weeds*—Very few weeds. *Pastures*—Of average growth and quality. *Live Stock*—Stock throve fairly well, but did not leave any profit in grazing; water shortage throughout the season affected autumn showings of cattle. Cattle and sheep free from disease. *Clip of Wool*—A good average clip of fine quality; ideal conditions during clipping season.

ANGUS (Western). *Wheat*—42 bushels; quality of grain and straw very good; seed, 3 to 4 bushels drilled. *Barley*—36 bushels; good quality; straw likewise; seed, 3 to 4 bushels drilled. *Oats*—58 bushels; quality very good; straw likewise; seed, 4 to 7 bushels, according to variety and district. *Harvest*—Was early and all secured in good order. *Hay*—An average of nearly 2 tons per acre, and of good quality; all well secured. *Meadow Hay*—Very little grown. *Potatoes*—Not such a big crop as last year—say, 7 tons; considerable disease in some varieties, which was not very evident when the crop was growing. *Turnips*—Say, 17 tons; yellow turnips, owing to drought, were in some instances a small crop; swedes improved much after the rain came; crop brairded all right. *Insects*—No special injury. *Weeds*—Nothing out of the ordinary. *Pastures*—Some were very bare in early autumn, but improved much later. *Live Stock*—Throve well, but their value was about the same at the end of the season. Cattle and sheep free from disease. *Clip of Wool*—About an average.

ABERDEEN DISTRICT.

ANGUS (Eastern). *Wheat*—The dry warm summer suited the crop, and though the weight of straw was slightly under the average, the grain was of excellent quality and threshed well; from 40 to 56 bushels per acre, weighing 63 lb. per bushel; a considerable increase in acreage on the good corn-growing land; about 4 bushels per acre is the usual seeding, but where 'Ceresan' or a like dressing is used, rather less is advisable. *Barley*—A very much less acreage was grown; crop suffered from drought; straw much under average; grain fine quality, but quantity 8 bushels under average, not exceeding 40 bushels in most cases; weight 56 to 58 lb. per bushel; seed sown, 3½ bushels. *Oats*—On the best land a very fine crop, harvested in excellent condition; 80 to 100 bushels per acre, and weighing 44 to 46 lb. per bushel; 30 cwt. of straw; on thin gravelly land a disappointing crop; very short and badly filled owing to excessive drought, and grain often not 40 lb. per bushel; on cold damp land the best crop for many years was harvested; seed sown on good land, where 'dressed,' is being reduced to under 5 bushels of the thick-skinned varieties. *Harvest*—Began the end of July and beginning of August—three weeks earlier than usual; finished, under excellent conditions, by the end of August. *Hay*—Crop quite an average for quantity; 50 to 60 cwt. per acre; the quality could not be better. *Meadow Hay*—Practically none grown. *Potatoes*—About the same tonnage as last year, 8 to 10 tons, but in some varieties, especially Kerr's Pink, there was a considerable amount of disease after the crop was lifted—in some cases 50 per cent; of the new varieties, Doonstar and Arran Banner have done very well. *Turnips*—Crop brairded well and came fast to the hoe, but was badly affected by drought; yellow turnips, though sound, were a very poor crop of small corky stuff; swedes, after getting rain in September, grew into more than an average crop, 30 to 34 tons per acre being by no means uncommon, and they were sound and of fine quality. *Insects*—No damage reported by insects, but great complaints of the ravages of wood-pigeons; this pest is very much on the increase; the damage done to young swedes and laid grain crop is often serious. *Weeds*—Owing to the dry summer were much easier overcome than is usual. *Pastures*—Were short of growth during summer, but they came early in spring, and recovered somewhat in September; never carried a heavy stocking. *Live Stock*—Where stocked light, stock throve well and kept healthy and put on condition. *Clip of Wool*—Sheep were clipped rather earlier, owing to the hot weather; this tended to make the clip lighter, but the quality was quite average.

KINCARDINESHIRE. *Wheat*—44 to 60 bushels per acre; quality of grain and straw excellent, the yield of grain being much above the average; 4 bushels per acre sown. *Barley*—34 to 35 bushels per acre; quality of grain and straw excellent, and the yield of grain considerably above the average; 4 bushels per acre sown. *Oats*—Thin-skinned varieties, 24 to 52 bushels per acre; thick-skinned, 32 to 84 bushels per acre; lea roots were the best crop; clean-land oats varied greatly, in many cases being thin on the ground and very short in the straw, but the yield all over was much better than the appearance of the crop indicated, and the quality of both grain and straw was excellent; 6 to 8 bushels per acre sown; 'Ceresan' was used very extensively, and gave very satisfactory results; it is well worth the small extra cost. *Harvest*—Began early in August—the earliest for a very long time; the weather was excellent, and the harvest was a very short one. *Hay*—Was not quite up to the average, but was secured in excellent order; average about 45 cwt. per acre. *Meadow Hay*—None grown. *Potatoes*—Very varied; from 6 to 10 tons per acre; disease was very prevalent in several varieties, and the crop did not keep well in the pits; no new varieties grown. *Turnips*—Swedes were mostly a good average crop, but yellow turnips were in many cases a very indifferent crop, being seriously affected by the dry weather; mildew was common; rain in the autumn helped the crop, and swedes especially grew well during the winter, as the weather was very open and favourable for growth; yellows would average from 6 to 15 tons per acre, and swedes from 10 to 22 tons; early sown turnips came well to the hoe, but others were slow to braird owing to the lack of moisture and resowing was quite common. *Insects*—Damage to oats by grub was very small, especially where 'Ceresan' was used. *Weeds*—Were fewer than usual, and were easily kept in check. *Pastures*—Were quite abundant in the early part of the season, but owing to the continued dry weather keep was scarce in the late summer and early autumn. *Live Stock*—All kinds throve well, and were generally free from disease. *Clip of* Wool—Was quite an average, and quality good.

ABERDEENSHIRE (Buchan). *Wheat*—None grown. *Barley*—40 bushels per acre; seed from 3 to 4 bushels per acre. *Oats*—Being a very early season and above the average for oats, the yield would be about 46 bushels per acre; seed from 4 to 7 bushels per acre. *Harvest*—Started about the first week of August, being about three weeks before the usual time. *Hay*—Splendid quality but light crop; about 30 cwt. per acre. *Meadow Hay*—None grown. *Potatoes*—

5 tons per acre, being slightly less than last year; no disease; no new varieties so far as known. *Turnips*—A light crop, being badly mildewed; probable weight, 12 tons per acre; brairded well and no resowing. *Insects*—None. *Weeds*—None. *Pastures*—The pastures had not an average growth, but were of good quality. *Live Stock*—Throve very well. Cattle and sheep free from disease. *Clip of Wool*—A good average for weight and quality.

ABERDEENSHIRE (Central). *Wheat*—Very little grown. *Barley*—36 bushels per acre, 4 bushels less than last year; natural bushel weight 56 lb., 1½ lb. more than last year; seed sown, 3 to 3½ bushels per acre where drilled, 4 bushels per acre where sown by broadcast sowing machine, or sown by hand; quantity of straw less than last year; quality of grain better than last year. *Oats*—48 bushels per acre, 3½ bushels less than last year; natural bushel weight 43½ lb., 1 lb. heavier than last year; straw 21 to 23 cwt., 3 cwt. less than last year; seed sown: potato and all thin-husked varieties on an average 5 bushels per acre; where sown by drill machine, broadcasted or sown by hand, 1 to 1½ bushels extra; all thick-husked varieties 2 to 3 bushels additional. *Harvest*—Began generally about the 1st of August, and was mostly completed by the end of the month; seldom has there been so good a harvest or quality of crops. *Hay*—22 cwt. per acre, 4 cwt. less than last year; quality better than last year; mixture of grass and clover much the same as last year. *Meadow Hay*—Less productive than last year. *Potatoes*—7 tons per acre, much the same as last year; quality very good; disease reported only to a very small extent; no new varieties reported. *Turnips*—10 tons per acre, 3 tons less than last year; the crop brairded well; finger-and-toe reported only to a small extent; crop generally suffered from lack of rain; earlier crops mildewed to some extent, but partially recovered after getting rain; quantity and quality were worse, generally, than last year; crop as a whole irregular. *Insects*—No report of injury by insects. *Weeds*—No report of injury by weeds. *Pastures*—Quality was good; rather bare from lack of rain during the earlier part of the season, but improved very much towards the end of the year after getting rain. *Live Stock*—All stock throve satisfactorily. No disease reported in cattle and sheep. *Clip of Wool*—Much the same as last year.

ABERDEENSHIRE (Strathbogie). *Wheat*—None grown. *Barley*—Quantity grown very much below average, but what was grown was fair good quality; yield varied from 40 to 48 bushels per acre, weighing 54 to 58 lb. per bushel; 4 bushels per acre were sown. *Oats*—Slightly better than 1932, and yield above average; the yield would be from 46 to 64 bushels per acre, and the weight 42 to 46 lb. per bushel; the straw was of excellent quality, but below average in quantity, due to the dry summer. *Harvest*—Owing to the exceptionally dry season, harvesting commenced very early and in most cases was finished at the time it is usually started. In some parts harvest started in July, which is most exceptional. *Hay*—Grown almost entirely for home consumpt. *Meadow Hay*—None grown. *Potatoes*—Yield above average, and quality excellent, but difficult to keep in pits; Kerr's Pink and Golden Wonder main varieties; no new varieties grown. *Turnips*—Crop very satisfactory, especially swedes; little or no resowing. *Insects*—No trouble with insects, but sheep troubled with maggots. *Weeds*—Land easily cleaned of weeds. *Pastures*—Abundant. *Live Stock*—Throve well. Cattle and sheep free from disease. *Clip of Wool*—Clip above the average; slight increase in price; good demand.

BANFFSHIRE (Lower). *Wheat*—Very small acreage grown. *Barley*—About 45 bushels per acre, of excellent quality; natural weight, 56 to 59 lb. per bushel; seed sown, 4 bushels per acre; straw of fine quality. *Oats*—52 to 60 bushels per acre, of very fine quality; natural weight about 45 to 48 lb. per bushel; seed sown, 6 bushels per acre; straw very good quality. *Harvest*—Began about three weeks earlier than usual. *Hay*—Less than last year, about 30 cwt. per acre. *Meadow Hay*—None grown. *Potatoes*—Similar to last year and of good quality; 8 tons per acre; no disease; no new varieties planted. *Turnips*—Lighter than last year, about 15 tons per acre; brairded slowly, and in many cases second sowing was necessary owing to lack of moisture. *Insects*—No damage by insects. *Weeds*—No injury by weeds. *Pastures*—Below average growth and quality; not so good as last year. *Live Stock*—Throve fairly well, but not so well as in previous years. Cattle and sheep free of disease, but cases of grass sickness among horses occurred. *Clip of Wool*—About average.

BANFFSHIRE (Upper). *Wheat*—None grown. *Barley*—Very little grown, as distillers left home barley for foreign until the present season, when they are calling for home grain. *Oats*—The staple grain crop of the district; the abnormal heat and drought of summer resulted in a short crop; both grain and straw very good quality; grain, 32 to 48 bushels per acre; seed sown, 6 bushels per acre. *Harvest*—Commenced the first week of August, six weeks before usual time. *Hay*—Quality very good; quantity from 1 to 2 tons per acre, according to locality; crop somewhat less on account of prevailing drought during May and June. *Meadow Hay*—Good growth; pastured when the sown grasses get bare. *Potatoes*—Only planted for home use; a full crop of 6 to 7 tons per acre; no disease. *Turnips*—Grew admirably for about two months, then the abnormal heat brought on mildew, which caused the bulbs to rot and shrivel. *Insects*—No damage done. *Weeds*—Were easily kept down with ordinary hoeing and shimming. *Pastures*—Came up early, but were affected by the dry weather in July; aftermath came in handy. Cattle and sheep throve well throughout the season, and free from disease, but sheep very much affected by maggots, owing to heat. *Clip of Wool*—About average.

INVERNESS DISTRICT.

MORAYSHIRE. *Wheat*—23 cwt per acre; straw, 30 cwt. per acre; quality first class; 4 bushels per acre sown. *Barley*—18 cwt. per acre; quality very good; weight 56 lb. per bushel; straw, 17 cwt. per acre; 4 bushels sown. *Oats*—15 cwt. per acre; quality good; weight rather variable on account of drought; straw, 20 cwt. per acre. *Harvest*—Four weeks earlier than usual. *Hay*—25 cwt. per acre; quality fairly good, but a shortage of clover; crop well secured. *Meadow Hay*—Less productive than last year. *Potatoes*—Yield not so good as last year and quality not quite so good; little disease noticeable; no new varieties planted. *Turnips*—14½ tons per acre; quality not so good as last year; crop brairded well, but there was some resowing on very light land. *Insects*—No damage by insects. *Weeds*—Fields better cleaned than for a considerable period, owing to better weather conditions for cleaning operations. *Pastures*—Growth of pastures not so good as last year. *Live Stock*—Throve exceedingly well. Cattle and sheep free from disease, but some complaints of more cases of foot-rot than usual amongst sheep in the autumn. *Clip of Wool*—An average.

NAIRNSHIRE. *Wheat*—Little grown. *Barley*—About 32 bushels per acre; seed, 4 bushels per acre. *Oats*—About 48 bushels; straw more plentiful than last year; seed, 6 to 7 bushels per acre. *Harvest*—Began about three weeks earlier than usual. *Hay*—An average crop. *Meadow Hay*—None grown. *Potatoes*—About 6 tons; no disease. *Turnips*—Short of average; owing to dry season resowing took place on most farms; the later sown yellows, although sound, did not bulk. *Insects*—No injury. *Weeds*—No injury. *Pasture*—Good. *Live Stock*—Throve well and free from disease. *Clip of Wool*—Average.

INVERNESS-SHIRE (Inverness). *Wheat*—Owing to the subsidy a larger area was grown; quality good average; 40 bushels per acre; straw good; seed, 4 to 5 bushels per acre. *Barley*—A small acreage grown; 40 bushels per acre; quality very good and heavy. *Oats*—A good crop, except on very light land; thrashed out well; straw very good quality. *Harvest*—One of the earliest harvests on record; began cutting on 1st August, finished one month earlier than last year; the weather was very good throughout, and no damaged grain. *Hay*—A very good crop, and secured in excellent condition; average on good land, 2 tons per acre. *Meadow Hay*—A good crop and well secured. *Potatoes*—Not so heavy a crop as last year; a larger proportion of tubers of seed size; quality good; some disease. *Turnips*—In early districts suffered very badly from the long spell of drought and got early mildewed; did well on the higher ground. *Pastures*—On light land suffered from the drought, but did very well at the back-end of the year. *Live Stock*—Throve very well. Cattle and sheep free from disease except for maggot-fly, which was very bad on many farms. *Clip of Wool*—Quality good, but clip less than last year; prices better.

INVERNESS-SHIRE (Skye). *Wheat*—None grown. *Barley*—None grown. *Oats*—A fair crop. *Harvest*—The earliest harvest on record; commenced about the second week of August and finished about the middle of September; the crops were stacked in excellent condition. *Hay*—A medium crop as to bulk; quality good; on the whole a better crop than that of the previous year. *Meadow Hay*—An average crop, but not so heavy as last year; secured in splendid condition. *Potatoes*—A good crop, and free from disease. *Turnips*—Crop was rather unsatisfactory; the roots grew to a fair size, and disease was not too prevalent, but, on the whole, the quality was inferior. *Insects*

—No appreciable damage. *Weeds*—Less damage than usual, due to the dry summer. *Pastures*—Were good throughout the whole season. *Live Stock*—Notwithstanding a good grazing season, lambs on the whole were scarcely as strong as was expected; both cattle and sheep were in very good condition in the back-end of the year. Cattle and sheep from May onwards were fairly free from disease. *Clip of Wool*—The weight of the wool generally was over that of last year's, and was easier to market.

INVERNESS-SHIRE (Lochaber). *Wheat*—None grown. *Barley*—None grown. *Oats*—Average crop; secured in very good order due to excellent harvesting weather; seed sown about 6 bushels per acre. *Harvest*—Began about the 21st of August, which was much earlier than usual. *Hay*—Ryegrass and clover good crop; quality good; much the same as last year; secured in good order by the first week in August. *Meadow Hay*—Average crop; quality not so good as last year, and in some cases not secured in very good order. *Potatoes*—Average crop; not so abundant as last year; rather large percentage of small potatoes; free from disease, but did not keep very well in pits; principal varieties planted were Kerr's Pink and Golden Wonder; no new varieties; crops were secured earlier than usual. *Turnips*—Good crop; average quality; quantity and quality better than last year; no second sowings were required. *Insects*—No injury. *Weeds*—No injury; easily destroyed due to long spell of good weather. *Pastures*—Were of average growth and quality; kept growing well into winter, owing to mild weather. *Live Stock*—Throve well on the pastures. Cattle and sheep were free from disease. *Clip of Wool*—Generally about the average.

ROSS-SHIRE (Dingwall and Munlochy). *Wheat*—Very little sown, though more this season; yield 36 to 40 bushels per acre; seed sown, 3 to 4 bushels. *Barley*—Not much grown; yield 32 to 40 bushels per acre; seed sown, 4 bushels; quality of grain and straw good. *Oats*—Yield, 40 to 72 bushels per acre; seed sown, 5 to 8 bushels; very fine quality of grain and straw. *Harvest*—Started quite a fortnight before average time; all crops were secured quickly and in the best of order, owing to the fine weather. *Hay*—1 to 1½ tons per acre; quality very good. *Meadow Hay*—None grown. *Potatoes*—Yield, 4 to 8 tons per acre; very little disease, if any. *Turnips*—Not a good crop owing to disease and mildew caused by the very dry weather; early sown turnips brairded well, later sown were very patchy; weight of swedes, 8 to 20 tons per acre; yellows, 8 to 16 tons per acre. *Insects*—No damage. *Weeds*—No injury. *Pastures*—Quite an average growth and quality. *Live Stock*—Did not thrive too well owing to the dryness of the pastures. Cattle and sheep were free from disease. *Clip of Wool*—About average and of good quality.

ROSS-SHIRE (Tain, Cromarty and Invergordon). *Wheat*—A good crop on good land; on thinnish land not so good as last year; 4 to 5½ quarters; an average crop of 36 bushels; quality good; straw good; seed, 4 bushels per acre. *Barley*—Threshed extra well on good land; 40 bushels per acre; straw very light generally; quality and colour very good; seed, 3½ to 4 bushels per acre. *Oats*—A fair crop; suffered from weather being too dry; about 48 bushels per acre; quality of grain and straw good; seed, 4 to 6 bushels per acre, according to variety. *Harvest*—Commenced about ten days earlier than usual. *Hay*—A light crop; about 30 cwt. per acre; quality middling, due to dry weather; greater portion secured in good order. *Meadow Hay*—None grown. *Potatoes*—About 6 tons per acre; a little blight; spraying was resorted to extensively. *Turnips*—Early swedes a fair crop; later sown ones were also middling; yellows, owing to dry weather, were the worst for years; swedes about 22 tons per acre; yellows 18. *Insects*—No great injury. *Weeds*—Land was generally clean. *Pastures*—Very much affected by the dry weather; aftermath worst for many years. *Live Stock*—Did not do too well on grass. Cattle very free from disease, but worms of all kinds in sheep, causing much concern. *Clip of Wool*—Average.

CAITHNESS-SHIRE. *Wheat*—Very small quantities grown, and then only experimentally. *Barley*—Only small quantities grown; where grown, crops were of average bulk and quality; seed sown, about 4 bushels per acre. *Oats*—Several varieties were grown, Castleton Potato and Sandy being the most popular; straw was shorter than usual owing to prolonged drought; quality of grain good; 40 bushels per acre; average quantity; straw about 2 tons per acre; seed sown varied from 3½ bushels per acre of small-grained varieties to 7 bushels of large-grained varieties. *Harvest*—Began six weeks earlier than usual; many fields were in stook during the first week of August; weather was favourable throughout, and crops were secured in good condition. *Hay*—Of average quantity and quality; clover a little more abundant than ryegrass; average quantity about 2½ tons per acre. *Meadow Hay*—Average crop, was mostly pastured; cut crops were of good quality, and were secured in good condition. *Potatoes*—Not quite so abundant as last year; tubers not of great size; there was very little disease of any kind; 6 to 8 tons per acre; some new varieties were planted with good results. *Turnips*—Yellows about 20 to 25 tons per acre; swedes 28 to 30 tons; crops brairded well and kept growing until the end of November; yellows greatly affected by disease and did not keep well; swedes were healthier and grew big; very little resowing. *Insects*—Practically no damage caused by insects or grub. *Weeds*—The dry season was very favourable for the growth of thistles, which ripened early in corn crops and pastures; spurrey, sorrel and coltsfoot grew profusely; rather worse than usual. *Pastures*—Were good and of average growth and quality; wild white clover especially abundant; kept growing until late in the year. *Live Stock*—Throve well on pastures; both cattle and sheep made good progress; the shortage of water necessitated additional labour, as water had to be carted to many fields. Cattle were practically free from disease; sheep were severely affected by the maggot-fly. The attack of this pest was unprecedented, retarding lambs from thriving. *Clip of Wool*—An average clip and of good quality.

ORKNEY. *Wheat*—None grown. *Bere*—Sowing was completed about middle of May; seed, 4 bushels per acre; healthy plants, and considered the earliest on record; cutting commenced on some farms at end of July, and all finished by end of August; secured in yard by middle of September, crop under average weight owing to dry and early season; yield about 39 bushels per acre; weight averaging about 49 lb. per bushel. *Oats*—Sowing commenced third week of March with land in fine condition, but work held up by rainstorms during first fortnight of April; sowing was very irregular, some only being finished about 10th May; about 18th May braird on early sown fields appeared unusually strong and vigorous; later sowings were much handicapped by cold northerly winds, consequently ravages by grub were evident; grain and straw a superior crop but very light off clean land; grain averaged 41 lb. per bushel, a high return per acre of 40 bushels. *Harvest*—Commenced first week of August and was general about mid-August; crops secured by mid-September; ideal conditions for working self-binders; no shake, and crops were got in good condition; probably the earliest harvest on record. *Hay*—Crop above average in quality and quantity; cutting commenced last week of June; quality good and secured in good condition; aftermath slightly thinner than usual owing to dry season; average slightly over 2 tons per acre. *Meadow Hay*—Very little grown, but best crop in quantity and quality for a good number of years. *Potatoes*—An abundant crop and free from disease; about 7 tons per acre; no new varieties; a very early crop and secured under good conditions. *Turnips*—Sowing commenced prior to middle of May and ended about middle of June; singling commenced about 20th June and mostly finished about 16th July, fully a fortnight in advance of average years; early sowings, plants almost meeting in drill about 20th July; showers in July improved growth; no resowings; yield a little less than last year; swedes good quality, but yellows showed some soft centres. *Insects*—On some farms the later sowings of oats were damaged by grub; no damage from turnip-fly and practically no finger-and-toe. *Weeds*—Owing to the dry year and the extensive use of wild white clover, weeds gave very little trouble. *Pastures*—Of fresh and green appearance in March; rain in April gave new vigour to the grasses, and cattle were seen pasturing on some farms about the 1st May; longest grazing season on record; on some holdings grazed up to the end of the year. *Live Stock*—Cattle did well on grass, but market prices were low; sheep did well on pastures; early lambs were more numerous than usual; lambing among the larger flocks commenced about 20th April; probably the best year on record for lambs; good weather, with plenty of grass, gave the lambs a good start. *Clip of Wool*—Average.

SHETLAND. *Wheat*—None grown. *Barley*—None grown. *Oats*—Although the weather was dry the progress was not impaired; the early harvest gave the crop ample time to ripen properly; average yield, 20 cwt. grain, 40 cwt. straw; secured in moderately good condition, but there was an absence of drying winds during September. *Harvest*—Began three weeks to a month earlier than usual. *Hay*—About an average; there was a lack of clover, but ryegrass did quite well; average about 30 cwt.; secured in good order. *Meadow Hay*—About average; weight about 16 to 18 cwt. per acre. *Potatoes*—About an average; yield, 8 to 10 tons per acre; a small percentage of decayed tubers at lifting time; Bally Doon tried in one district, and gave good yield of quality potatoes. *Turnips*—About 20 tons per acre; quality generally good, and better than last year; brairded very quickly; no resowing required; in many parts finger-and-toe was much in evidence, but is now being kept in check by the use of disease-resisting varieties. *Insects*—No injury to any extent. *Weeds*—Caused a little damage to crops; charlock was evident in many districts; thistles caused certain amount of damage, especially on sandy soils. *Pastures*—The season was rather dry for pasture; growth and quality were not quite so good as last year. *Live Stock*—Owing to the dry summer stock did not thrive until the growth of pasture late in August; from then until the end of the year grass kept fresh and green. Cattle and sheep were free from disease. *Clip of Wool*—Clip was not so heavy as other years, but the quality was much about the same.

THE WEATHER OF SCOTLAND IN 1933.

By J. CRICHTON, M.A., B.Sc., F.R.S.E., The Observatory, Eskdalemuir.

THIS report consists of (1) a general description of the weather from month to month, and (2) a selection of rainfall returns in which each county of Scotland is represented by one or more stations. It is to be noted that all temperature readings referred to are, unless otherwise stated, from the thermometers exposed in the regulation " Stevenson Screen."

JANUARY.

Unsettled, rather mild and at times stormy weather characterised the opening days of the month, the barometric pressure being generally below the normal. About the 7th an improvement set in, the weather becoming somewhat more settled. Between the 15th and 18th rather broken weather prevailed, but thereafter a cold and mainly fair spell was experienced with high barometric readings, and this persisted until the 30th, when there was a return to mild and stormy conditions. Gales were frequent during the first week, again around the 20th and on the 31st. The most widespread and severe gales were those of the 2nd when the wind reached momentarily a velocity of 80 miles per hour at Butt of Lewis, 79 at Lerwick and 73 at Kirkwall and Edinburgh. The gales of 31st were also widespread and rather severe.

During the first ten days of the month temperatures were well above the average, day maxima frequently being over 50° F. in many districts ; on the 2nd the temperature rose to 57° F. at Fort William and to the same figure on the 8th at Dunbar. The mean temperature for the month, however, was below normal, and this was due to the prolonged cold anticyclonic spell during the latter half of the month. In this period the maximum on some days failed to reach 32° F. ; on the 28th the maximum at Renfrew was only 26° F. and on each of the 24th and 25th only 28° F., these low readings being partly attributable to the persistence of fog. Rather low night temperatures were also recorded during this spell, notable minima being 4° F., 6° F. and 9° F. at Logie-Coldstone, Braemar and Balmoral respectively on the 19th, and 9° F., 10° F. and 10° F. at the same three stations on the 20th.

Ground frosts were also widespread and at times very severe, the temperature on the grass dropping to —1° F. at Braemar, 1° F. at Balmoral and 3° F. at Logie-Coldstone on the 19th.

Rainfall totals all along the eastern seaboard, with the exception of Fife, and locally in the west, were below the average, the deficiency being most pronounced in the extreme north-east. Elsewhere the rainfall was above the average; at Ettrick Manse in Selkirk more than twice the normal was recorded. The heaviest falls were recorded during the opening days of the month, particularly on the 2nd and 3rd and on the 31st. On each of these days, chiefly in the west, falls locally exceeded 2 inches. On the last day, the 31st, Tyndrum had 3·82 inches, Kinlochquoich 3·30 inches, Evan Water 3·14 inches and Achnacarry 3·06 inches. (A fall of 1 inch of rain, it should be noted, yields approximately 101 tons of water per acre.) Taking, however, the month as a whole, some places were very dry: thus at Belhaven and Dunbar in the south-east and at Gordon Castle in Morayshire the total in each case was less than 1 inch. In contrast with these the total at Arrochar was almost 15 inches and at Kinlochquoich about 18 inches.

Snow, sleet or hail fell between the 3rd and 6th and again between the 15th and the end of the month. The most widespread falls of snow were probably those of the 17th and 30th; on the latter date 6 to 9 inches lay in the Glasgow area. During the cold spell the snow tended to lie, particularly between the 17th and 20th. Fog was rather frequent, especially during the anticyclonic spell, occurring on 16 days in Glasgow, on 12 at Stirling and Dunfermline and on 10 at Greenock. The fog on 17th was extremely dense at Glasgow, and also on the 20th and 24th in the River Forth estuary.

There were a few local thunderstorms on 2nd and from 4th to 7th, while aurora was observed on at least 9 different nights.

Sunshine aggregates were everywhere above the normal, the excess being well marked in south-eastern areas. Edinburgh enjoyed 30 hours' bright sunshine above that normally experienced in January.

FEBRUARY.

The stormy unsettled weather, which set in towards the end of January, continued into February, and persisted until about the 9th, when there was a great change, the barometric pressure rising considerably to the west and north-west and a cold northerly type of weather becoming established. Towards the end of the month there was a recurrence of stormy and wet conditions, but on this occasion the winds were chiefly easterly. Gales were not infrequent, the most widespread and severe being those of the opening days and those between the 25th and 28th. On the 2nd the wind in a gust reached 77 miles per hour at Butt of Lewis and 71 at Bell Rock Lighthouse, while on the 13th a gust at Lerwick reached 89 and one at Kirkwall 75.

During the first ten days of the month, as in January, temperatures were well above the average, a maximum of 57° F. being recorded at Edinburgh on the 3rd and at both Ayr and Dunbar on the 8th. Around the 10th cold air from polar regions flowed across the country and caused a considerable fall in temperatures generally. The cold spell persisted until near the end of the month; the coldest period lay around the 23rd and 26th, the screen temperature at Dalwhinnie dropping to 11° F. on the morning of 24th. Ground frosts were widespread and in places severe; on both the 23rd and 24th the grass temperature at Dalwhinnie was 6° F. and on the 11th 7° F.

Rainfall totals, in parts of the Hebrides and south-western districts and over a narrow strip of country running down central Scotland, were below the average; elsewhere they were generally above it. The wettest period was centred round the 4th, on which date many places had over an inch of rain; on this date 2·99 inches fell at Kinlochquoich and 2·85 inches at Glenbranter. Hail, sleet and snow were of frequent occurrence, hail falling in the Shetlands on at least 18 days and in the Hebrides on at least 11. The outstanding weather feature of the month was the snowstorm which started in England on the 23rd and extended later to Scotland. In Scotland the storm was not so intense as south of the border, but nevertheless it was of sufficient severity as to interfere in many parts with road and rail services; 12 inches of snow lay at Lamington on 25th and 26th, and from 8 to 9 inches on various days at Dalwhinnie, Tyndrum, Achnashellach and Craibstone. From the 17th onwards the snow tended to lie in many parts. On account of the frequency of strong winds the snow drifted locally.

Fog was noted on 14 days in one place or another, while aurora was observed on 9 different nights. There were a few thunderstorms in extreme northern and north-western districts in the early part of the month, but the storms were of an isolated nature.

The month was, on the whole, rather dull, sunshine aggregates being generally less than the average; at Edinburgh and Stornoway the normal February sunshine was enjoyed.

MARCH.

The presence of depressions in the neighbourhood of the British Isles gave rise, during the first ten days and again round the middle of the month, to rather disturbed and at times stormy weather; strong winds were of frequent occurrence, the wind on the 8th at Edinburgh reaching in a gust a velocity of 61 miles per hour and on the 15th at Butt of Lewis 77 miles per hour. During the remainder of the month anticyclonic conditions prevailed, the days being mainly dry, sunny and warm.

An outstanding feature of the month was the mildness of the days, the 11th, 25th and 28th being, for the time of year, very warm. At Blackford Hill Observatory, Edinburgh, it was the warmest March on record, and for Scotland as a whole perhaps the warmest since 1882. On the 28th some very high temperatures were recorded; on this date Aberdeen had a maximum of 70° F., this being a March record for the station. Night temperatures were generally rather low, this being largely due to the prevalence of starry nights which permitted of cooling by outward radiation. It was not uncommon for the coldest night to be followed by the warmest day, thus, for example, the air temperature in the early morning of the 25th at North Berwick was 28° F. and this was followed on the same day by a maximum of 63° F., these being extremes for the month and giving a daily range of 35° F. The lowest screen temperature registered was that of 21° F. at Balmoral on the 21st, whilst that on the grass was 9° F. at Dalwhinnie on the 18th.

The month was exceptionally dry, precipitation being confined mostly to a few days at the beginning, middle and end of the month; the largest daily falls were registered between the 3rd and 8th, falls of over an inch occurring at a number of places on one or more of these days, the greatest being perhaps that of 2·50 inches at Inverchaolain, near Toward, in Argyllshire on the 8th. Rainfall aggregates were, however, everywhere well below the normal, the deficiency in the Inverness area being as much as 80 per cent. Between the 18th and 20th sleet or snow showers occurred in most districts, but no heavy falls of snow were reported.

Thunderstorms, mostly of a local character, occurred on 5th, 6th, 16th, 17th and 30th; those of 5th were rather intense in the Glencoe area. Fog, as in the previous month, was rather prevalent, being reported on no less than 16 different days; the districts mostly affected lay between the Firth of Clyde and Firth of Forth.

Another prominent feature of the month was the amount of sunshine enjoyed in all districts excepting perhaps the extreme north-west; more than an hour's sunshine per day above the normal March figure was experienced in eastern and south-eastern counties. The last fortnight was particularly sunny; between the 24th and 28th the daily sunshine at Edinburgh exceeded 10 hours per day, while at Aberdeen it was the sunniest March since 1907.

Aurora was visible on 7 nights, the display of 19th being perhaps the most widely observed.

APRIL.

During the greater part of the month the barometric distribution was chiefly anticyclonic, pressure generally being highest to the south of Scotland; on the 15th a rather vigorous depression, which passed eastwards just to the north of Scotland, was followed by a considerable rise in pressure in that area and this rise gradually spread south-eastwards. About the 23rd, however, a low pressure system, centred on the Atlantic, extended its influence eastwards and dominated the weather situation for the remainder of the month. Strong winds were experienced at the beginning of the month, between the 8th and 15th and again on the 25th and 26th, gale force being reached at times locally; on the 12th there was a gust of 78 miles per hour at Kirkwall and one of 71 miles per hour at Lerwick.

Both day and night temperatures were on the average above those normally occurring in April, it being the mildest month of that name since 1914.. Maxima of over 60° F. were recorded in eastern counties, but in the west they failed to reach this level. The extremes of temperature for the month were 68° F. at Stonehaven on the 9th and 20° F. at Wolfelee on the 21st. The coldest nights mostly lay between the 17th and 23rd, and the mildest between 2nd and 4th, 15th and 16th and 25th to 27th. The nights of 7th and 30th were also very mild. On the morning of the 23rd the temperature on the grass at Dalwhinnie was 13° F.

Over eastern Scotland, with the exception of parts of Aberdeenshire and the Lothians, and over extreme south-western districts, rainfall totals were generally below the average, the deficiency locally reaching 50 per cent; elsewhere the totals were above normal, the excess locally exceeding 70 per cent. On the 2nd, 8th and 14th, the wettest days, falls of over an inch were not uncommon. At Dunhulladale, Lochcarron, the 2nd was exceptionally wet, the total for the day being 6·50 inches; only on four occasions between 1865 and 1931 has such a great rainfall been recorded in Scotland. Other noteworthy falls on the same day were 4·14 inches at Kinlochquoich, 3·13 inches at Glenquoich and 2·55 inches at Glenbranter. Snow or sleet showers occurred on several occasions, particularly on 1st and from 18th to 20th, but no large falls were reported.

Thunderstorms were noted on the 11th, 27th, 28th and 29th, those of 28th and 29th being widespread. The storms of 29th were very destructive locally; for example, at Fyvie Castle the storm was accompanied by heavy hail, the hail lying 6 inches deep in places; fruit trees and bushes were damaged and several large trees struck down.

Fog was reported on 6 days and aurora was visible on at least 6 nights.

The month was generally dull, there being a deficiency of sunshine in all districts; there were, however, a few very bright days, particularly the 18th, 23rd and 28th.

MAY.

Throughout most of the month Scotland lay in a region of barometric pressure which separated two high and two low pressure systems, and as a result the weather was mainly quiet, the days being often cloudy and thunderstorms frequent. No gales were reported, and locally it was one of the calmest Mays on record.

Day temperatures differed little from the average, but the nights were very mild and as a consequence the mean temperature for the month was rather high, it being the mildest May since 1922. The warmest period occurred between the 20th and 22nd, temperatures approaching or exceeding 70° F. in many areas; 73° F. was recorded on the 21st at Perth and on the 22nd at Kilmarnock and Ruthwell. In the Shetlands the highest temperature during the month remained under 60° F. Although the nights were generally mild, there were a few cold mornings, particularly in the Central Grampian area, the mornings chiefly affected being the 2nd, 3rd, 14th and 15th. In the screen the temperature on the morning of the 2nd dropped to 25° F. at both Balmoral and Dalwhinnie, the grass temperature at the latter place being 13° F.

The frequency of thundery showers gave rise to a rather irregular distribution of rainfall, but taking Scotland as a whole rainfall aggregates were well below the average, the deficiency locally exceeding 70 per cent. In parts of Argyllshire, Dumfriesshire and in regions adjoining the estuary and valley of the Clyde the rainfall approached or exceeded the normal. The wettest period lay between the 21st and 26th, when falls of over an inch occurred locally, the largest being 2·20 inches on the 26th at Evan Water, near Moffat. At Glenquoich, where the total for the month was only 1·72 inches, there have only been two drier Mays in the last 57 years—namely 1901 and 1928, while at Gordon Castle, with a total of only 0·66 inches, there has only been one drier May since 1866—namely 1912, when only 0·28 inches were recorded. Hail fell locally on a few days, and there was a slight snow shower at Braemar on the 1st.

Thunderstorms occurred on at least 18 days, aurora on 2 and fog on 11 ; the fog was rather dense at Lerwick on the 7th and 25th.

Over most of Scotland the month was very dull, sunshine aggregates generally being below the average. In the Western Isles, particularly at Tiree, there was, however, plenty of sunshine, over 200 hours being registered there, while locally in eastern Scotland there were less than 100 hours. Tiree enjoyed 9 days with over 11 hours sunshine per day. At Blackford Hill Observatory it was the most sunless May since records commenced.

JUNE.

Warm, sunny and mainly dry weather was fairly general during June, it being one of the finest summer months on record. At the beginning of the month barometric pressure was high to the east and low to the west of the British Isles, and at the end low to the east and high to the west. In the intervening period the pressure distribution was more or less of a cyclonic type. Strong winds were infrequent, but gales were experienced locally on the 1st and around the 16th ; on the 16th a gust of 65 miles per hour was registered at Butt of Lewis.

It was the warmest June since at least 1858, both the mean day and night temperatures being well above the normal. On the 4th, 7th, 15th, 25th, 26th and 30th the temperature rose to or exceeded 75° F. locally, while on the 4th, 7th and 15th 80° F. was exceeded. 86° F. was reached at Gordon Castle on the 4th and at Forres on the 7th. Locally in the Western Isles and in the Orkneys and Shetlands the highest temperatures recorded did not reach the 70° F. level. There were 7 mornings with ground frost in places, the coldest being the 12th when the grass temperature at Dalwhinnie was 22° F. ; on the same morning at the same place the screen temperature fell to 28° F.

For the fourth successive month rainfall aggregates were in many parts below the average, the wettest areas in June being confined to north-western and south-western districts where there was locally a slight excess. The wettest period centred around the 17th when in places there were falls of more than an inch. 1·50 inches were recorded at Glen Etive on the 17th and at Lochgoilhead on the 18th ; on the 18th

1·52 inches fell at Balerno. Hail showers were reported on 12th, 18th and 19th.

On 16 different days thunderstorms occurred, the most widespread being those of the 18th, 21st and 22nd, on which dates few areas escaped ; less widespread storms were those of 8th, 24th and 25th, those of 8th affecting eastern districts and those of 24th and 25th chiefly south-western areas. Fog occurred on 8 days and was dense locally in the Shetlands and in the north-east between the 13th and 15th and in the Firth of Forth on the 1st and 14th.

The most prominent feature of the month was the amount of sunshine experienced everywhere. In the far north at Balta Sound 243 hours of bright sunshine were enjoyed, it being the sunniest month there since May 1919, while at Lerwick it was the sunniest month on record. At Kirkwall there previously had, since 1891, been only one sunnier month, and that June 1930. Generally along the east coast there were between 240 and 250 hours of sunshine ; the amounts in the west were somewhat less, being mostly of the order 200 hours. On at least 7 days 15 hours sunshine were enjoyed at some place or other. On the 12th, 20th and 24th there was locally more than 16 hours registered, while on the last date Lerwick enjoyed over 17 hours.

JULY.

Anticyclonic conditions prevailed during the first week, very warm, dry and sunny weather being experienced everywhere ; between the 7th and 15th, owing to the presence of an extensive low pressure system between Iceland and Scotland, it became less settled. During the following week there was a decided improvement, a return being made to warm and sunny weather. After this, the approach of depressions from the south-west brought rain to most districts. Strong winds were experienced locally during the last few days of the month, and in places gusts of gale force were recorded.

The first week was very warm, it being perhaps the warmest on record in Scotland ; taking the month as a whole it was the warmest July for at least 30 years. 88° F. was recorded at Ruthwell on the 5th, 87° F. at Perth and Kirkcaldy on the 4th, while 86° F. was frequently reported each day from the 2nd to 5th. There was a complete absence of ground frost throughout the month and screen temperatures remained above 40° F. at night in all areas.

Over the southern half of Scotland, and particularly in the county of Midlothian, rainfall totals exceeded the average, while in northern districts there was a slight deficiency. The wettest period lay between the 10th and 13th and from 27th to 30th when falls of over an inch were recorded. At Edinburgh, where the total was 4·78 inches, it was the wettest July since 1916.

On 17 days there were thunderstorms, the most widespread and severe being those of 7th and 27th; these were accompanied by vivid lightning, at times torrential rainfall, flooding, and locally by much structural damage.

Fog was reported on 11 days and was dense locally in northern districts during the opening days of the month.

Sunshine aggregates, excepting in north-western districts, were slightly above the average, the excess being largely due to the very sunny period experienced during the opening days, particularly those from the 1st to 5th when many places enjoyed as much as 15 hours sunshine per day.

AUGUST.

Anticyclonic weather conditions were experienced generally between the 1st and 5th, 10th and 12th, and 23rd to 27th, while in the intervening periods minor disturbances crossing the country were accompanied by less settled weather. For the most part barometric pressure was high to the east and south and low to the north-west of the British Isles, and this gave rise to a prevalence of mild south-west winds with much drier conditions in the east than in the west. Winds reached gale force in places on several occasions, particularly around the 8th, 17th and 28th. On the 8th at Kirkwall and on the 28th at Lerwick the wind reached momentarily a velocity of 64 miles per hour, while at Butt of Lewis on the 17th a gust of 60 miles per hour was registered.

For the seventh successive month the mean temperature exceeded the normal, it being the warmest August since 1911. The warmest period lay between the 3rd and 5th when locally August temperature records were broken; on the 3rd 83° F. was recorded at Aberdeen, a temperature which has not been reached there in early August since at least 1871. 83° F. was also registered on the 5th at Ruthwell, Paisley and Kilmarnock; on the same date 84° F. was recorded at Kelso. In the extreme north and north-west temperatures failed to reach the 70° F. level, the highest at Stornoway being 68° F. and at Lerwick 63° F. Ground frost occurred locally on the mornings of 7th, 12th and 24th; at Dalwhinnie on the 7th and 12th the grass minimum was 21° F., while on the 12th screen minimum was 32° F.

Locally in the west and north-west it was the wettest August on record, while in eastern districts it was the driest; aggregates of less than an inch for the month were frequent in the east, while at Ardgour, Achfary and Portree they, in each case, exceeded 10 inches. In the wet areas there were few dry days; at Balta Sound there was only 1 and at Duror only 2. The wettest day was the 27th when some places had more than 2 inches; on this day Stornoway had 2·75 inches, and much flooding and structural damage ensued.

Fog occurred on 5 days, thunderstorms and hail on 3; the fog was dense locally in the Shetland area on the 15th and the most widespread thunderstorms were those of 5th and 6th. Aurora was observed at Balta Sound on the night of 20th.

Sunshine aggregates were everywhere above the average; the 4th was very sunny, over 14 hours sunshine on that date being enjoyed locally along the eastern seaboard.

SEPTEMBER.

Throughout September, apart from a few days at the beginning and around the 18th, weather was mainly dry, quiet, warm and sunny. Strong winds and heavy rain did occur locally, and at times gale force was reached, but these occasions were few and mostly confined to the period between 17th and 20th and 24th; on the 18th the wind gusted to 57 miles per hour at Butt of Lewis, and on 24th to the same figure at Bell Rock Lighthouse.

It was the warmest September since 1898 and the eighth successive month during which the mean temperature was above the average. During the first week and around the 17th some high temperatures were registered, a few of the most noteworthy being 79° F. at Stonehaven on the 6th, 78° F. at Ayr on the 5th and at Ruthwell and North Berwick on the 6th and 77° F. at Kilmarnock on the 5th. 77° F. was also registered at North Berwick on the 17th, on which date Edinburgh University had 76° F. There were a few cool mornings, perhaps the coolest being those of 10th, 14th and 28th; the screen temperature at Dalwhinnie was only 30° F. on the mornings of 10th and 20th and at Glenbranter the grass temperatures of 14th and 28th only 26° F. and 24° F., respectively.

Everywhere rainfall aggregates were subnormal, the deficiency being very pronounced in southern areas, where total falls were generally about 80 per cent below the average. A wet period lay between the 17th and 20th when there were a few heavy falls, perhaps the greatest being 1·58 inches on the 19th at Poltalloch. At Glenbranter, where the total for the month was 1·28 inches, there were only 2 wet days, and one of these, the 20th, accounted for 1·16 inches of the total fall; similar conditions were experienced in many parts. At a few places in the west it was the driest September since 1894.

Thunderstorms occurred on 6 days, aurora was observed on

12 nights and fog was very prevalent, being noted on at least 20 different days.

Sunshine aggregates were in most areas above the normal, the excess being noteworthy in the Northern and Western Isles.

OCTOBER.

During the opening days of the month quiet anticyclonic weather was experienced generally; around the 7th the weather became somewhat less settled and continued so throughout the remainder of the month. Barometric pressure became high for a time to the west and north-west, and depressions, some of them intense, moved south-eastwards to the North Sea and Baltic and gave rise to a prevalence of north-easterly to northerly winds. Gales occurred on 13 days, the most widespread being those around 9th, 19th and 28th. The wind reached a momentary velocity of 87 miles per hour at Butt of Lewis on the 28th and 66 miles per hour at Eskdalemuir on the 9th and also at both Bell Rock Lighthouse and Tiree on the 28th.

The mean temperature was, as in the previous 8 months, above the average. The 4th was generally the warmest day, temperatures of over 60° F. being recorded in many places; on this day 68° F. was reached at Perth and Arbroath and 67° F. at Dundee, St Andrews and Leuchars. 67° F. was also reached at Ardtornish on the 1st. Ground frosts were experienced on at least 14 nights, the coldest nights being perhaps the 3rd, 12th, 26th, 27th and 28th. On the 3rd the grass temperature was 19° F. at Dalwhinnie, while on the 26th and 28th the same figure was noted at Auchincruive.

Rainfall aggregates in districts lying to the north of a line joining approximately the Hebrides to the Firth of Forth, excepting in the Orkneys, were above the average, many places in this area having twice the normal amount. South of this line totals for the month were subnormal. Falls of over an inch occurred on days at Achnacarry, Clunes, Fort William and Knoydart; 2 inches or over fell at Kyleakin on the 9th, at Fort William on the 10th, at Achnacarry, Clunes and Ardgour on the 13th and at Aberlour on the 28th, the largest of these being 2·75 inches at Clunes. Towards the end of the month there was serious flooding in the Garmouth area.

Aurora was observed on at least 8 nights, thunder occurred locally on 11 days, hail on 9 and snow on 8; the snow was most frequently reported between 25th and 27th; on the 27th it lay to a depth of 1 inch at Balmoral.

The month was generally cloudy, sunshine aggregates being everywhere below the average, the deficiency being very pronounced in the Hebrides.

NOVEMBER.

At the beginning of the month in the rear of a depression which moved south-eastwards from Iceland to Denmark strong north-westerly winds persisted for a few days and at times reached gale force in exposed places. Then followed an anticyclone from the Atlantic, the winds continued northerly, moderated and were unusually warm. Thereafter strong south-easterly winds, associated with a depression moving southward along the western seaboard, prevailed for a time and were followed later by quieter conditions which give rise to fog in many places. Towards the end of the month barometric pressure was high over Scandinavia and south-easterly winds were once again prevalent. Gales were reported from some place or another on the 1st, 2nd, 13th to 15th, 18th to 20th and 28th to 30th; on the 2nd the wind reached a velocity of 62 miles per hour at Aberdeen, 66 miles per hour at Bell Rock Lighthouse and 68 miles per hour at Butt of Lewis.

For the first month since January the mean temperature fell below normal. The 6th was unusually warm, 67° F. being reached at Arbroath, 64° F. at Perth and 63° F. at Crieff, Montrose and Stonehaven. Cold, north-easterly winds, which set in about the 25th, caused a general drop in temperature over the British Isles, some low screen temperatures being recorded on the 26th; on that day 19° F. was registered at Thorntonhall, West Linton and Balmoral, and 20° F. at Abbotsinch (near Renfrew) and Kilmarnock. During the cold period grass temperatures fell to 15° F. or less locally.

Over a small area, embracing Montrose, Aberdeen and Deeside, rainfall aggregates were above the average, but elsewhere there was a deficiency. A few places in the west and north-west had about a third of the normal November total, while only about one half was recorded in Lanarkshire and south-western Scotland. There were, however, a few local heavy falls around the 14th, particularly those of 2·12 inches at Garelochhead, 2·07 inches at Inverchaolain (Argyll) and 1·98 inches at Glenbranter.

Thunder was noted on 1 day, fog on 23, snow or sleet on 13 and aurora on 5. Southern and central Scotland was chiefly affected by the fog, particularly the Glasgow area, where it occurred on 21 days; on the 24th fog was very dense locally. On the 18th the snow lay to a depth of 1 inch at Balmoral.

In the extreme north and north-west more than the average sunshine was enjoyed, but elsewhere, especially in the east, there was less than the average.

DECEMBER.

Apart from minor interruptions, weather conditions were mainly anticyclonic, there being during the month a noteworthy lack of rain, absence of strong winds, a prevalence of fog and a very high average barometric pressure. It was the calmest December on record at Edinburgh. Strong winds and gales were not entirely absent, around the 1st, 4th, 12th and 21st and towards the end of the month gales occurred locally, particularly in western and northern districts. A gust of 60 miles per hour was registered at Tiree on the 1st, one of 63 at Butt of Lewis on the 22nd and one of 67 at Lerwick on the 30th.

The mean temperature for the month was just about equal to the average, the exceptional mildness in northern districts just balancing the deficiency elsewhere; the mildest area in Scotland embraced the Orkneys and Shetland Islands, the North-Western Isles and Caithness; the highest temperatures were recorded in these areas, the 22nd being perhaps the warmest, many places on that date having temperatures of over 52° F. The coldest period lay between the 10th and 14th; on the mornings of the 10th and 14th the screen temperature at Dalwhinnie was only 13° F. Ground frosts occurred at some place or another each morning excepting that of 23rd.

The outstanding feature of the month was its very low rainfall; at only a few isolated places did the aggregate exceed half the December average, the general amount recorded being only about one-fifth of the average. Towards the end of the month a few heavy falls of rain were recorded, the greatest being 1·24 inches at Portree in Skye and 1·22 inches at Gruline (Mull), both on 29th. In the counties adjoining the southern shores of the Moray Firth it was perhaps the driest December for more than 60 years.

Sleet or snow showers were reported at times, but no heavy falls of snow were noted; 2 inches lay at Balmoral on 13th and 14th. Fog was, as in the previous month, very prevalent and was dense at times locally; the Glasgow area was affected on at least 20 days. Aurora was visible on 6 nights.

Sunshine aggregates were mostly below the average, the areas with a slight excess being confined to the extreme north.

GENERAL NOTE.

Perhaps the most notable features of the year 1933 were (1) the mildness extending from February to October; (2) the deficiency in rainfall, it being the driest year since at least 1870; (3) the exceptionally fine summer and autumn; (4) the large amount of sunshine received in January and March and from June to September, June being exceptionally sunny; (5) the general quietness of the year and the occasional strength of the gales, momentary wind velocities of more than 80 miles per hour being recorded at Butt of Lewis and Lerwick; (6) the absence of severe snowstorms, that of 25th-26th February being perhaps the worst, when there was a depth of 1 foot at Lammington; (7) the frequency of thunder, particularly in the summer months; and (8) taking the year as a whole, the exceptional fineness of the weather throughout.

RAINFALL RECORDS FOR 1933, IN INCHES.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Shetland—Lerwick .	3·97	3·52	2·59	2·22	·69	·94	1·99	3·64	2·17	4·08	2·91	1·93	30·65
Orkney—Kirkwall . .	2·98	4·28	2·70	2·56	·86	1·05	1·80	2·58	·98	2·68	3·08	2·43	27·78
Sutherland—Tongue .	3·11	5·58	1·83	1·97	1·40	1·93	2·70	4·76	·92	5·23	3·00	·84	33·27
Lairg	2·19	4·73	1·31	2·52	1·33	2·03	1·52	2·52	·14	4·59	2·41	·83	26·12
Ross and Cromarty—													
Fortrose . . .	1·49	1·65	·52	2·10	·71	1·11	2·34	1·00	·18	3·71	·64	·19	15·64
Ardross Castle . .	3·18	3·51	1·52	2·60	1·12	2·68	2·73	1·53	·58	5·34	3·30	·41	28·40
Lochcarron . . .	7·62	7·86	2·32	12·42	2·16	3·83	5·18	8·70	1·60	6·97	4·47	2·05	65·18
Stornoway . . .	5·68	3·43	2·18	2·85	·92	2·05	2·49	6·09	·90	4·80	1·78	1·59	34·76
Inverness—Kingussie .	4·18	2·67	1·08	2·25	1·18	·98	2·50	1·32	1·34	5·42	1·48	·37	24·67
Inverness . . .	2·78	2·04	·42	2·29	1·04	2·04	3·23	1·77	1·02	3·88	·59	·25	21·35
Fort-William . .	11·48	5·73	4·41	6·07	2·30	3·35	4·09	7·28	1·61	10·52	3·38	2·27	62·49
Glenquoich . . .	15·48	9·00	4·73	9·69	1·72	3·28	2·14	10·61	1·67	9·99	3·50	2·76	74·57
Portree . . .	9·40	5·33	3·73	5·00	1·47	3·56	4·12	10·02	1·14	8·19	3·84	3·44	59·24
Nairn—Nairn . . .	1·31	1·99	·61	2·00	1·64	1·83	2·02	1·74	·74	2·96	·87	·28	17·99
Moray—Gordon Castle .	·99	3·48	·68	1·55	·66	1·80	3·11	1·56	2·04	6·38	1·69	·45	24·39
Grantown . . .	1·64	3·02	·98	2·44	1·38	1·55	2·92	2·06	·99	5·46	1·86	·26	24·56
Banff—Banff . . .	1·40	3·76	1·20	1·04	·41	1·57	2·39	1·19	1·09	4·12	3·68	1·44	23·29
Aberdeen—Fyvie Castle	1·68	5·30	2·52	2·85	·94	1·40	3·44	1·15	1·37	6·45	4·21	2·02	33·33
Peterhead . . .	2·25	2·38	1·40	1·82	1·06	1·41	3·31	1·19	1·34	5·37	3·07	2·27	26·87
Aberdeen (King's Coll.)	1·82	3·71	2·00	2·07	·97	·86	3·08	1·22	·90	4·71	3·24	1·91	26·49
Balmoral . . .	3·06	2·90	1·10	2·01	1·19	1·41	3·05	·87	2·30	7·14	4·34	1·19	30·56
Kincardine—													
Balmakewan . . .	2·43	2·71	2·06	1·39	1·19	1·23	2·47	·89	2·06	3·32	3·13	2·01	24·89
Angus—													
Montrose (Asylum) .	2·01	2·06	1·59	1·37	1·22	1·01	3·16	·93	1·13	3·52	2·82	1·54	22·36
Dundee	1·78	2·29	1·59	1·30	1·45	1·77	3·29	·94	1·57	3·81	2·37	1·19	23·35
Glamis Castle . .	2·87	3·44	1·87	1·36	1·99	1·33	3·28	·76	1·84	3·22	3·59	1·73	27·28
Brechin	2·62	2·71	2·42	1·36	1·59	1·00	2·61	·91	1·29	4·61	3·34	1·86	26·32
Perth—Blair Castle .	4·46	4·31	1·41	1·55	1·52	·73	2·70	1·51	1·89	3·78	3·29	·73	27·88
Crieff	4·53	3·52	1·78	1·52	2·02	1·52	3·28	1·23	1·72	3·66	2·90	·91	28·59
Perth	1·55	3·72	1·33	·80	1·42	1·10	2·72	·65	1·19	3·29	2·17	1·04	20·98
Fife—Cupar . . .	2·59	1·99	·79	·96	1·39	1·47	2·77	·82	2·10	3·14	2·13	·98	21·13
Kirkcaldy . . .	2·65	2·17	1·18	1·74	1·62	1·81	4·69	·96	1·85	2·33	1·40	·70	23·10
Kinross—Loch Leven .	3·43	2·90	1·78	1·30	1·65	1·84	4·32	·93	2·20	2·81	1·58	1·12	25·86
Clackmannan—													
Tillicoultry . . .	2·95	3·49	2·13	1·63	1·47	1·50	4·39	2·37	1·37	2·91	2·08	1·16	27·45
Argyll—Gruline (Mull) .	8·02	6·31	5·76	6·44	3·44	4·78	6·52	9·38	2·30	8·49	4·11	5·16	70·71
Oban	6·57	5·53	3·09	3·84	2·45	3·60	5·98	5·23	1·07	3·48	2·51	2·55	45·90
Glencoe Gardens . .	10·98	6·97	5·19	7·31	2·61	3·94	5·12	7·95	2·56	8·24	3·75	2·02	66·64
Inveraray . . .	9·59	7·98	5·26	4·72	4·63	5·28	5·95	8·28	1·38	6·89	4·99	4·45	69·40
Campbeltown . .	3·88	4·33	3·44	2·73	2·42	2·38	3·46	3·81	1·27	5·85	4·08	4·42	42·07
Bute—Rothesay . .	5·35	4·87	3·10	3·80	3·34	3·05	4·98	4·58	1·19	3·93	3·81	2·16	44·16
Stirling—Stirling . .	4·92	2·50	2·22	1·15	2·44	·97	3·28	1·67	·96	3·28	2·33	·51	26·18
Dumbarton—Arrochar .	11·27	9·16	6·20	5·04	3·77	3·83	6·44	7·15	1·62	6·62	4·85	2·33	68·28
Helensburgh . .	6·70	5·53	2·64	2·66	3·69	2·37	4·14	4·19	·72	2·66	3·33	1·12	39·75
Renfrew—Greenock .	8·64	4·88	3·95	2·99	3·62	3·09	3·77	3·51	·71	3·18	3·35	1·53	43·22
Paisley	5·05	3·67	2·89	2·07	2·66	2·26	2·98	2·46	·86	2·61	2·37	·68	30·56
Ayr—Kilmarnock . .	3·94	3·56	2·48	2·82	2·11	2·35	4·05	3·70	·75	2·89	1·89	1·62	32·16
Ayr	3·42	2·65	2·51	1·77	1·92	1·90	3·04	2·54	·99	2·58	1·46	1·29	26·07
Muirkirk . . .	5·10	4·90	3·35	2·80	2·70	2·29	4·79	4·09	1·16	3·75	2·05	1·27	38·25
Pinmore . . .	4·35	3·26	2·85	1·49	2·12	2·95	4·44	3·44	·74	4·20	2·54	2·15	34·53
Lanark—													
Glasgow (University) .	3·62	2·83	1·94	1·74	2·41	2·10	3·62	2·28	·66	2·42	1·65	·54	25·81
Lesmahagow . .	4·73	3·55	2·71	1·43	2·84	1·81	4·49	2·33	·94	3·13	1·36	·66	29·98
Biggar	4·47	3·11	1·38	1·71	2·64	1·40	4·90	2·09	·98	2·58	1·43	·58	27·27
Linlithgow—													
Uphall (Houston House)	3·36	2·14	1·39	1·58	2·28	1·59	4·18	1·69	2·02	2·58	1·70	·67	25·18
Midlothian—													
Edinburgh (University)	2·83	1·17	·86	1·87	1·59	1·77	4·57	·84	1·80	2·34	1·57	·95	22·16
Gorebridge . . .	2·40	1·64	·68	2·09	1·88	2·69	3·81	1·02	2·44	2·31	1·56	1·03	23·55
Oxenfoord Castle . .	1·29	1·51	·52	1·48	1·90	1·44	3·98	·79	3·08	1·89	2·15	1·44	21·47
Haddington—													
North Berwick . .	1·24	1·63	·89	2·10	1·09	1·54	2·47	·80	1·21	2·38	1·44	1·42	18·21
Stobshiels Reservoir .	3·13	2·14	·89	1·80	1·36	1·90	4·11	·57	2·33	3·43	3·25	2·50	27·41
Berwick—Duns Castle .	1·10	2·92	1·18	1·97	1·02	·91	3·86	1·86	1·20	3·74	2·50	1·58	24·29
Marchmont . . .	1·32	2·90	1·01	1·62	·89	1·09	3·85	1·48	1·34	3·63	2·50	1·26	22·89
Peebles—West Linton .	4·10	3·31	1·25	2·55	1·92	2·12	4·49	2·17	1·67	3·12	1·62	·99	29·31
Selkirk—Whitmuir Hall	3·60	2·91	1·20	1·56	1·71	1·52	3·50	·97	1·35	3·52	1·77	·76	24·37
Roxburgh—Branxholme	4·90	3·27	1·72	1·21	2·50	1·29	3·56	1·67	1·11	4·19	1·69	·83	27·94
Kelso (Broomlands) .	1·20	2·89	·62	1·37	1·19	·95	3·35	1·22	1·36	2·65	1·80	1·07	19·70
Dumfries—Dumfries .	5·33	2·54	1·98	1·69	3·02	2·45	3·37	1·58	1·16	2·50	2·04	·56	28·22
Moniaive . . .	7·23	5·36	4·02	2·68	3·69	3·11	6·54	2·43	1·22	3·64	2·49	1·86	44·22
Langholm . . .	6·16	4·22	2·73	3·01	2·90	2·67	6·80	3·66	·68	3·55	1·49	1·31	39·18
Eskdalemuir . .	7·75	7·00	3·68	3·04	2·52	2·20	6·85	2·85	1·04	3·70	2·07	1·31	44·01
Kirkcudbright—													
Dalbeattie (Kirkennan)	7·67	4·25	3·32	1·92	4·72	1·63	4·75	1·96	·35	3·12	2·60	2·55	38·84
Carsphairn (Shiel) .	10·12	7·72	5·45	3·32	3·69	4·11	7·17	3·98	1·83	5·91	3·53	2·29	59·12
Auchencairn. . .	5·84	4·48	2·65	1·99	3·58	2·78	3·62	1·96	1·07	2·32	2·55	2·05	34·89
Wigtown—Monreith .	3·65	3·96	1·92	1·48	2·01	2·50	3·02	1·93	·62	2·55	2·49	1·87	28·00

AGRICULTURAL STATISTICS.—Returned upon 4th June 1932—*(Compiled from the Government Returns)*

Table No. 1.—Acreage under Crops and Grass in each County of Scotland.

Counties.	Total Acreage under Crops and Grass.	Arable Land.	Permanent Grass.	Corn Crops.								Potatoes.	Turnips and Swedes.	Mangolds.	Sugar Beet.	Cabbage.	Rape.	Vetches or Tares (Seed).	Vetches, Tares, Beans, Mashlum, &c. (Fodder).	Small Fruit.	Rye-grasses and other Rotation Grasses and Clover.	Other Crops.	Bare Fallow.
				Wheat.	Barley, including Bere.	Oats.	Mixed Grain.	Rye.	Beans.	Peas.	Total.												
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres	Acres.	Acres.	Acres.	Acres.	Acres.
1. Aberdeen . .	621,482	570,162	51,320	9	5,781	174,856	14	49	4	49	18,062	8,096	74,226	1	1	228	67	3	1,885	247	304,043	322	281
2. Angus . .	243,135	209,793	33,342	11,344	6,535	57,895	30	206	57	14	76,081	19,760	26,552	14	43	236	142	3	447	1,467	84,716	238	94
3. Argyll . .	113,203	50,325	62,878	5	580	13,947	70	267	2	4	14,875	2,657	4,389	4	..	39	151	1	46	14	27,760	63	326
4. Ayr . . .	304,316	125,926	178,890	632	18	33,288	21	12	99	12	34,082	9,200	6,259	181	1	216	432	..	603	182	74,288	279	203
5. Banff . . .	156,184	142,198	13,986	7	3,521	44,872	7	15	24	6	48,452	1,762	17,911	..	1	9	40	16	505	13	73,371	16	102
6. Berwick . .	183,137	119,274	68,863	1,672	7,613	26,482	63	4	213	6	36,053	2,306	16,942	107	1	49	912	..	226	23	62,584	17	54
7. Bute . . .	25,778	14,226	11,552	8	1	3,950	..	19	1	3	3,982	1,065	1,067	4	..	8	33	..	11	7	7,956	16	77
8. Caithness . .	103,649	79,427	24,222	..	331	25,558	..	8	..	11	25,908	1,036	9,507	..	..	22	..	2	186	2	42,673	7	84
9. Clackmannan .	15,144	7,264	7,860	190	26	2,714	..	..	177	..	3,107	399	680	1	5	8	4	1	105	81	2,819	2	52
10. Dumfries . .	240,842	117,597	123,245	41	76	32,168	10	6	..	1	32,322	3,451	12,813	84	..	100	488	1	186	48	68,020	72	12
11. Dunbarton .	44 485	19,928	24,557	342	20	5,639	8	..	..	..	6,009	2,282	1,161	6	..	56	167	..	90	89	9,962	50	56
12. East Lothian .	108,040	79,293	28,747	4,819	10,460	14,966	57	..	13	204	30,519	8,497	10,671	306	71	982	271	3	275	263	26,473	816	146
13. Fife . . .	235,123	152,679	82,444	11,321	7,292	40,442	215	391	259	28	59,948	16,954	18,030	26	419	171	363	9	500	276	55,314	193	476
14. Inverness . .	148,911	81,045	67,866	9	2,648	28,207	724	681	..	1	32,270	4,585	7,977	..	..	106	22	..	131	16	34,955	58	925
15. Kincardine .	116,755	104,263	12,492	997	3,164	31,691	5	2	2	4	35,865	4,539	13,894	..	13	14	66	..	263	62	49,462	56	24
16. Kinross . .	31,653	19,621	12,032	201	64	6,015	6	38	..	..	6,324	1,266	2,005	..	..	16	81	1	41	8	9,858	6	15
17. Kirkcudbright .	178,710	76,774	101,936	32	37	18,486	9	..	..	1	18,565	1,428	7,836	36	..	55	788	1	85	29	47,794	80	77
18. Lanark . .	237,672	120,434	117,238	1,674	46	32,953	4	20	17	47	34,761	6,899	8,260	23	..	522	874	3	410	1,198	66,439	635	410
19. Mid-Lothian .	115,574	71,216	44,358	4,404	2,391	19,195	32	2	..	66	26,090	6,367	7,791	28	6	441	498	2	155	174	29,109	457	98
20. Moray . .	96,334	87,915	8,419	674	4,403	26,210	57	227	24	1	31,596	1,794	12,164	6	17	14	36	4	374	17	41,751	84	58
21. Nairn . . .	25,020	23,077	1,943	32	897	6,901	8	6	1	1	7,846	275	3,507	..	5	4	..	..	68	2	11,332	11	27
22. Orkney . .	107,864	91,568	16,296	..	2,746	29,457	4	14	..	..	32,221	2,015	12,204	..	..	12	..	1	137	..	44,899	7	72
23. Peebles . .	51,037	20,978	30,059	7	14	4,978	..	..	..	1	5,000	327	2,346	..	..	21	432	2	46	36	12,757	6	5
24. Perth . . .	318 068	205,905	112,163	7,147	1,118	59,324	66	457	620	14	68,746	18,818	20,124	18	56	186	506	8	796	3,309	92,521	107	710
25. Renfrew . .	78,421	28,499	49,922	1,273	32	7,813	..	3	20	12	9,153	3,302	1,658	4	..	137	157	..	34	99	13,686	165	104
26. Ross & Cromarty	137,731	105,482	32,249	829	2,963	32,747	63	141	4	1	36,748	7,011	12,641	6	15	255	55	39	325	14	47,975	53	345
27. Roxburgh . .	174,169	104,185	69,984	935	4,295	22,074	37	2	16	3	27,36 2	1,337	14,333	36	..	73	362	3	130	34	60,390	31	94
28. Selkirk . .	29,910	13,266	16,644	5	21	3,048	2	..	..	..	3,076	138	1,857	2	..	10	57	..	8	4	8,114	..	..
29. Stirling . .	109,936	45,800	64,136	1,511	108	15,446	40	35	1,100	3	18,243	3,609	3,081	4	..	96	344	4	623	152	18,944	57	643
30. Sutherland .	30,729	20,674	10,055	..	130	6,399	5	5	..	1	6,540	975	2,310	1	..	6	4	2	22	1	10,697	6	110
31. West Lothian .	53,600	29,985	23,615	1,872	1,021	9,819	43	..	23	1	12,779	2,612	2,760	10	6	53	249	2	156	46	11,143	24	145
32. Wigtown . .	153,474	94,501	58,973	80	37	24,048	3	10	61	10	24,249	1,820	10,563	164	5	27	147	2	186	7	57,123	63	125
33. Zetland . .	26,631	12,883	13,748	..	479	5,766	10	4	..	..	6,259	1,957	945	..	..	644	..	..	15	..	2,535	3	525
Total . .	4,622,217	3,046,163	1,576,054	52,072	68,868	867,374	1613	2624	2737	505	995,793	148,539	348,464	1072	665	4816	7748	113	9075	7920	1,511,463	4020	6475

N.B.—*The figures given above are those for* 1932, *which appeared in last volume. The figures for* 1933 *were not available at the time of going to press.*

TABLE No. 2.—TOTAL PRODUCE OF WHEAT AND BARLEY, ACREAGE and YIELD per Acre in the Year 1932, compared with the YIELD for the Year 1931, and the AVERAGE of the Ten Years, 1922-1931, in each COUNTY of SCOTLAND.

COUNTIES.	WHEAT.								BARLEY, INCLUDING BERE.							
	Total Produce in 1932.		Acreage in 1932.	Yield per acre.				Average of the Ten Years, 1922-1931.	Total Produce in 1932.		Acreage in 1932.	Yield per acre.				Average of the Ten Years, 1922-1931.
				1932.		1931.						1932.		1931.		
	Qrs.	Tons.	Acres.	Bush.	Cwt.	Bush.	Cwt.	Bush	Qrs.	Tons.	Acres.	Bush.	Cwt.	Bush.	Cwt.	Bush.
Aberdeen	30	6	9	36.0	16.1	..	..	*29.9	26,000	5,100	5,781	36.0	17.7	33.4	16.2	32.3
Angus	54,000	12,000	11,344	37.8	21.3	33.4	18.6	36.7	31,000	6,000	6,535	37.7	18.4	35.2	17.0	36.6
Argyll	25	5	5	40.0	21.4	32.0	11.4	..	2,200	400	580	30.0	13.8	32.4	15.1	33.4
Ayr	3,800	810	632	47.8	25.7	44.4	23.9	45.5	70	12	18	31.2	13.8	35.7	17.1	36.9
Banff	25	5	7	30.6	15.4	..	..	..	17,000	3,300	3,521	38.9	18.9	37.6	18.2	39.0
Berwick	8,000	1,750	1,672	38.3	21.0	31.2	16.6	38.7	38,000	7,200	7,613	39.7	18.8	31.8	14.5	35.0
Bute	40	9	8	42.0	21.4	..	..	§34.4	5	1	1	42.0	19.5	38.4	17.2	39.0
Caithness	..	..	..	..	..	..	..	..	1,400	250	331	34.6	15.4	34.9	15.3	36.5
Clackmannan	1,100	250	190	47.2	26.1	43.7	24.4	40.8	150	30	26	48.6	23.9	42.6	20.9	39.3
Dumfries	260	60	41	49.7	27.0	37.0	20.1	38.9	360	60	76	37.8	16.9	34.3	15.3	37.0
Dunbarton	1,900	420	342	44.6	24.3	40.8	21.1	37.4	90	16	20	35.4	15.6	24.0	10.7	*31.8
East Lothian	28,000	6,100	4,819	45.8	25.5	38.7	20.8	44.0	64,000	13,000	10,460	48.7	24.2	41.5	19.9	46.5
Fife	60,000	13,400	11,321	42.6	23.8	32.5	17.5	35.6	42,000	8,200	7,292	45.6	22.4	34.6	16.0	39.4
Inverness	40	9	9	36.0	19.3	36.0	19.9	*38.8	9,000	1,700	2,648	27.1	12.6	28.9	13.5	27.1
Kincardine	4,700	1,000	997	37.8	21.2	32.7	17.5	36.4	13,000	2,500	3,164	33.2	15.9	31.2	14.3	35.8
Kinross	1,000	230	201	41.5	23.0	38.6	21.5	37.9	320	60	64	39.3	19.2	39.6	19.7	35.3
Kirkcudbright	160	35	32	39.9	22.4	37.2	20.6	36.7	180	35	37	37.8	18.9	31.7	15.4	36.1
Lanark	7,800	1,700	1,674	37.1	20.0	34.9	18.3	36.1	200	40	46	35.5	16.9	32.3	14.7	32.4
Mid-Lothian	24,000	5,300	4,404	43.7	24.2	40.5	21.3	44.7	13,000	2,600	2,391	44.0	21.7	41.1	18.9	43.8
Moray	3,600	830	674	43.3	24.7	41.3	23.0	41.8	21,000	4,100	4,403	38.1	18.6	38.2	18.7	38.6
Nairn	150	30	32	37.0	19.8	..	..	..	3,000	570	897	27.2	12.8	31.3	14.8	31.5
Orkney	..	..	..	..	..	..	..	..	13,000	2,300	2,746	38.2	16.7	38.2	16.8	34.9
Peebles	40	8	7	40.0	22.1	40.0	21.4	..	70	14	14	40.0	19.6	38.0	17.0	36.4
Perth	38,600	8,400	7,147	43.2	23.5	36.6	19.7	37.3	6,200	1,200	1,118	44.4	21.7	39.5	19.4	36.8
Renfrew	6,700	1,400	1,273	42.3	22.7	42.4	22.4	41.9	140	27	32	36.0	16.7	36.0	16.1	36.0
Ross and Cromarty	4,500	970	829	43.6	23.4	39.5	21.6	42.2	12,000	2,100	2,963	31.8	14.5	32.1	14.9	38.6
Roxburgh	4,500	1,000	935	39.0	21.9	30.0	16.3	38.0	20,000	4,100	4,295	37.9	19.1	32.2	16.0	36.8
Selkirk	20	4	5	30.0	16.1	30.0	16.1	‡36.0	90	17	21	33.8	16.6	24.0	11.8	38.1
Stirling	6,600	1,500	1,511	35.0	19.4	35.1	18.7	35.2	520	100	108	38.8	19.2	35.9	17.3	33.4
Sutherland	..	..	..	..	..	..	..	..	620	120	130	38.2	18.6	37.8	18.4	37.3
West Lothian	10,500	2,300	1,872	44.9	24.6	38.7	20.8	45.0	5,900	1,200	1,021	45.9	22.6	42.3	19.9	46.7
Wigtown	480	100	80	48.8	26.5	..	..	§36.7	200	40	37	44.2	22.1	35.6	17.3	41.5
Zetland	..	..	..	..	..	..	..	..	1,600	300	479	27.3	12.6	30.8	14.2	30.8
Total all Scotland	270,570	59,631	52,072	41.5	23.0	35.6	19.2	38.6	342,315	66,692	68,868	39.7	19.3	35.3	16.8	37.1

* Average of 9 years only. § Average of 8 years only. ‡ Average of 5 years only.

N.B.—*The figures given above are those for* 1932, *which appeared in last volume. The figures for* 1933 *were not available at the time of going to press.*

TABLE No. 3.—TOTAL PRODUCE OF OATS, ACREAGE and YIELD per Acre in the Year 1932, compared with the YIELD for the Year 1931, and the AVERAGE of the Ten Years, 1922-1931, in each COUNTY OF SCOTLAND.

COUNTIES.	OATS.							
	Total Produce in 1932.		Acreage in 1932.	Yield per acre.				Average of the Ten Years, 1922-1931.
				1932.		1931.		
	Qrs.	Tons.	Acres.	Bush.	Cwt	Bush.	Cwt.	Bush
Aberdeen	979,000	149,000	174,856	44.8	17.0	38.3	14.3	37.1
Angus	369,000	56,000	57,895	51.0	19.5	47.0	17.5	49.1
Argyll	70,000	10,000	13,947	40.1	14.3	38.5	13.6	37.1
Ayr	208,000	30,000	33,288	49.9	17.9	47.0	16.7	46.9
Banff	263,000	40,000	44,872	46.8	17.6	42.1	16.0	43.5
Berwick	129,000	19,000	26,482	38.8	14.7	34.0	12.6	39.2
Bute	22,000	3,200	3,950	44.9	16.1	43.0	15.3	41.6
Caithness	113,000	16,000	25,558	35.5	12.8	36.0	12.6	35.2
Clackmannan	22,000	3,200	2,714	63.9	23.9	47.4	17.6	45.1
Dumfries	180,000	26,000	32,188	44.6	16.2	37.0	13.4	39.9
Dunbarton	21,000	4,600	5,639	44.6	16.4	41.5	14.5	41.7
East Lothian	112,000	17,000	14,966	60.0	23.0	52.4	19.1	55.7
Fife	290,000	44,000	40,442	57.5	21.8	44.2	16.4	47.2
Inverness	113,000	16,000	28,207	32.0	11.3	31.6	11.1	28.9
Kincardine	199,000	31,000	31,691	50.2	19.4	42.6	15.4	46.0
Kinross	40,000	6,000	6,015	53.6	20.0	46.1	16.7	41.3
Kirkcudbright	94,000	14,000	18,486	40.9	14.6	38.8	13.5	35.3
Lanark	174,000	25,000	32,953	42.2	15.4	38.9	13.8	41.3
Mid-Lothian	130,000	20,000	19,195	54.2	20.3	51.0	18.5	50.4
Moray	155,000	24,000	26,210	47.4	18.6	41.0	15.4	42.2
Nairn	34,000	5,000	6,901	38.9	14.5	39.6	14.8	35.6
Orkney	145,000	20,000	29,457	39.3	13.8	39.0	13.7	35.5
Peebles	26,000	3,800	4,978	42.1	15.8	37.6	13.0	40.0
Perth	381,000	56,000	59,324	51.3	19.0	43.6	15.9	44.9
Renfrew	41,000	6,000	7,818	41.5	15.4	40.6	14.5	39.9
Ross and Cromarty	166,000	25,000	32,747	40.6	15.0	38.7	14.2	39.9
Roxburgh	129,000	19,000	22,074	46.7	17.0	39.4	14.3	39.9
Selkirk	14,000	2,100	3,048	38.0	13.7	33.0	11.8	34.2
Stirling	88,000	13,000	15,446	45.6	17.4	38.0	13.9	47.1
Sutherland	29,000	4,300	6,399	36.4	13.4	36.4	13.4	35.8
West Lothian	65,000	9,800	9,819	53.4	20.0	49.0	18.1	53.2
Wigtown	164,000	25,000	24,048	54.5	20.8	43.8	16.4	38.6
Zetland	18,000	2,500	5,766	24.4	8.8	31.3	11.2	27.6
Total all Scotland	4,993,000	745,500	867,374	46.1	17.2	40.7	14.9	41.3

N.B.—*The figures given above are those for* 1932, *which appeared in last volume. The figures for* 1933 *were not available at the time of going to press.*

TABLE NO. 4.—TOTAL PRODUCE OF BEANS AND POTATOES, ACREAGE and YIELD per Acre in the Year 1932, compared with the YIELD for BEANS for the Year 1931 and for POTATOES for the Years 1931 and 1930, and the AVERAGE of the Ten Years, 1922-1931, in each COUNTY of SCOTLAND.

COUNTIES.	BEANS.								POTATOES.					
	Total Produce in 1932.		Acreage in 1932.	Yield per acre.				Average of the Ten Years, 1922-1931.	Total Produce in 1932.	Acreage in 1932.	Yield per acre.			Average of the Ten Years, 1922-1931.
				1932.		1931.					1932.	1931.	1930.	
	Qrs.	Tons.	Acres.	Bush	Cwt.	Bush.	Cwt	Bush.	Tons.	Acres.	Tons.	Tons.	Tons.	Tons.
Aberdeen	16	3	4	28.4	15.1	17.0	9.1	15.2	59,000	8,096	7.2	5.1	5.3	6.0
Angus	290	65	57	41.5	23.2	44.5	25.1	41.2	144,000	19,760	7.3	4.9	6.8	6.6
Argyll	14	3	2	44.4	23.0	41.5	21.5	*36.5	16,000	2,657	5.9	4.4	5.6	5.3
Ayr	410	90	99	33.2	17.7	32.0	16.0	35.5	81,000	9,200	8.8	7.6	9.3	8.4
Banff	90	20	24	30.9	17.3	22.8	12.8	21.9	12,000	1,762	6.6	4.9	5.4	5.8
Berwick	880	190	213	32.9	18.2	32.6	17.6	30.5	15,000	2,306	6.6	4.1	5.5	5.6
Bute	4	1	1	40.0	20.4	38.0	19.0	36.1	7,500	1,065	7.0	5.7	7.0	6.4
Caithness	..	..	..	..	..	..	..	..	7,400	1,036	7.2	5.3	6.1	5.8
Clackmannan	940	210	177	42.6	24.0	38.0	21.4	37.4	2,600	399	6.5	4.2	5.9	6.0
Dumfries	..	..	..	..	..	..	..	..	30,000	3,451	8.7	5.6	8.0	7.2
Dunbarton	..	..	..	..	..	..	..	†26.2	18,000	2,282	8.1	5.9	7.6	7.1
East Lothian	50	11	13	28.8	16.2	32.3	17.7	35.2	68,000	8,497	8.1	5.7	8.1	7.4
Fife	1,300	290	259	40.8	22.7	34.2	19.0	37.2	159,000	16,954	9.4	5.2	7.6	6.7
Inverness	..	..	..	..	..	..	..	..	26,000	4,585	5.8	4.8	5.7	4.3
Kincardine	7	2	2	36.0	21.2	24.9	13.1	31.2	29,000	4,539	6.4	4.9	5.9	6.0
Kinross	..	..	..	..	..	..	..	..	8,200	1,266	6.5	4.0	5.7	6.2
Kirkcudbright	..	..	..	..	..	33.0	18.3	*32.5	9,200	1,428	6.5	4.9	7.6	7.0
Lanark	80	16	17	36.0	18.6	..	..	..	52,000	6,899	7.6	5.5	7.3	6.9
Mid-Lothian	..	..	..	..	..	38.0	21.4	§35.2	51,000	6,367	8.0	6.6	7.9	7.5
Moray	120	26	24	38.2	21.5	23.9	13.4	26.3	13,000	1,794	7.0	5.4	5.8	6.1
Nairn	5	1	1	24.0	12.4	..	..	..	1,500	275	5.5	4.3	4.7	4.6
Orkney	..	..	..	..	..	..	..	..	11,000	2,015	5.4	7.6	5.8	5.6
Peebles	..	..	..	..	..	..	..	..	2,500	327	7.8	5.9	7.5	7.0
Perth	2,300	530	620	29.9	17.0	30.1	15.9	32.7	145,000	18,818	7.7	5.0	6.9	6.4
Renfrew	100	22	20	40.0	21.4	40.0	21.4	40.5	26,000	3,302	7.9	7.7	7.6	8.2
Ross and Cromarty	16	3	4	32.0	17.2	30.0	16.1	‡21.3	46,000	7,011	6.6	5.4	6.4	5.8
Roxburgh	60	13	16	30.6	16.4	21.9	12.0	27.3	12,000	1,337	9.1	4.6	8.0	6.4
Selkirk	..	..	..	..	..	..	..	..	1,200	138	8.6	3.8	6.6	5.9
Stirling	4,800	1,100	1,100	35.0	19.3	24.0	12.8	31.6	32,000	3,609	9.0	6.0	6.6	7.9
Sutherland	..	..	..	..	..	..	..	..	6,500	975	6.7	4.7	6.3	5.6
West Lothian	110	25	23	38.4	21.8	32.0	17.8	36.5	22,000	2,612	8.3	5.9	8.4	7.7
Wigtown	250	50	61	32.5	17.4	29.6	15.9	25.5	17,000	1,820	9.4	5.0	7.9	6.7
Zetland	..	..	..	..	..	..	..	..	11,000	1,957	5.7	5.9	3.2	5.8
Total	11,842	2,671	2,737	34.7	19.3	29.5	15.9	32.8	1,141,600	148,539	7.7	5.5	7.0	6.6

* Average of 9 years only. † Average of 7 years only. ‡ Average of 6 years only. § Average of 8 years only.

N.B.—*The figures given above are those for 1932, which appeared in last volume. The figures for 1933 were not available at the time of going to press.*

TABLE No. 5.—TOTAL PRODUCE of TURNIPS, SWEDES, and MANGOLDS, ACREAGE and YIELD per Acre in the Year 1932, compared with the YIELD for the Years 1931 and 1930, and the AVERAGE of the Ten Years, 1922-1931, in each COUNTY of SCOTLAND.

COUNTIES	TURNIPS AND SWEDES.						MANGOLDS					
	Total Produce in 1932.	Acreage in 1932.	Yield per Acre.			Average of the Ten Years, 1922-1931.	Total Produce in 1932.	Acreage in 1932.	Yield per Acre.			Average of the Ten Years, 1922-1931.
			1932.	1931.	1930.				1932.	1931.	1930.	
	Tons.	Acres.	Tons.	Tons.	Tons.	Tons.	Tons.	Acres.	Tons.	Tons.	Tons.	Tons.
Aberdeen	1,031,000	74,226	13.9	15.6	11.8	15.2	20	1	11.0	11.7	..	11.0§
Angus	503,000	26,552	18.9	14.4	15.1	17.7	170	14	12.3	12.0	19.0	15.8
Argyll	73,000	4,389	16.6	15.4	17.0	14.9	50	4	12.5	13.6	16.7	12.6
Ayr	130,000	6,259	20.8	16.9	21.0	18.9	3,900	181	21.5	19.8	21.8	20.1
Banff	279,000	17,911	15.6	16.6	16.8	16.0	..	..	..	16.0	12.0	..
Berwick	343,000	16,942	20.2	15.0	15.1	18.4	2,000	107	18.2	15.5	22.3	17.5
Bute	18,000	1,067	17.2	14.0	17.0	15.0	70	4	16.0	13.9	16.9	13.2*
Caithness	182,000	9,507	19.2	17.0	17.8	18.6	..	..	..	..	..	..
Clackmannan	8,500	680	12.8	10.4	12.5	15.1	20	1	20.0	..	24.0	..
Dumfries	236,000	12,813	18.4	17.2	19.9	18.3	1,360	84	16.3	15.0	17.0	16.5
Dunbarton	23,000	1,161	20.0	15.4	16.8	17.6	140	6	23.9	15.0	21.9	19.1
East Lothian	199,000	10,671	18.6	16.7	19.6	19.9	6,900	306	22.6	16.3	22.4	20.4
Fife	236,000	18,030	13.1	11.2	16.0	17.7	450	26	17.1	15.0	18.7	17.5
Inverness	104,000	7,977	13.1	13.0	13.0	13.0	..	..	..	..	..	..
Kincardine	211,000	13,894	15.2	16.1	18.1	19.4	..	..	..	..	..	..
Kinross	29,000	2,005	14.6	7.8	11.5	15.2	..	..	..	..	24.0	..
Kirkcudbright	120,000	7,836	15.3	12.3	16.4	15.2	580	36	15.9	14.2	16.7	15.9
Lanark	157,000	8,260	19.1	18.4	21.4	19.4	510	23	22.5	17.7	20.3	17.3
Mid-Lothian	143,000	7,791	18.3	16.5	19.0	18.6	520	28	18.3	19.0	21.4	21.0
Moray	272,000	12,164	22.4	15.9	15.8	16.5	120	6	20.5	19.5	20.0	16.4
Nairn	45,000	3,507	12.8	12.1	12.6	12.9	..	..	..	..	..	..
Orkney	141,000	12,204	11.5	11.1	12.4	10.8	..	..	..	..	..	..
Peebles	42,000	2,346	18.0	17.2	20.4	18.9	..	..	..	15.0	..	..
Perth	381,000	20,124	18.9	16.0	17.8	17.2	330	18	18.1	11.3	15.0	13.5
Renfrew	32,000	1,658	19.1	18.9	18.6	18.0	90	4	20.0	20.0	20.0	18.5
Ross and Cromarty	185,000	12,641	14.6	14.9	15.8	16.0	80	6	12.0	12.0	14.0	14.8
Roxburgh	268,000	14,333	18.7	12.8	14.6	15.6	840	36	23.4	13.2	13.3	13.0
Selkirk	32,000	1,857	17.4	11.4	13.5	15.8	50	2	22.4	14.0	10.0	14.0‡
Stirling	53,000	3,081	17.2	12.0	17.1	19.9	50	4	12.0	8.0	9.7	18.9
Sutherland	41,000	2,310	17.7	11.9	17.7	15.4	20	1	12.0	8.0	..	..
West Lothian	52,000	2,760	19.0	16.6	19.9	19.5	190	10	20.3	15.0	20.8	21.1
Wigtown	201,000	10,563	19.0	16.2	16.4	16.2	3,500	164	21.4	15.0	21.9	16.9
Zetland	9,500	945	10.2	8.2	5.9	11.6	..	..	..	..	..	..
Total	5,780,000	348,464	16.6	15.1	15.6	16.6	21,900	1,072	20.4	16.2	20.8	18.2

* Average of 9 years only

‡ Average of 6 years only.

§ Average of 8 years only.

N.B.—*The figures given above are those for 1932, which appeared in last volume. The figures for* 1933 *were not available at the time of going to press.*

TABLE No. 6.—TOTAL PRODUCE OF HAY from Rye-Grass and other Rotation Grasses and Clover, also Total from Permanent Grass, ACREAGE, and YIELD per Acre in the Year 1932, compared with the YIELD for the Years 1931 and 1930, and the AVERAGE of the Ten Years, 1922-1931, in each COUNTY of SCOTLAND.

COUNTIES.	FROM RYE-GRASS AND OTHER ROTATION GRASSES AND CLOVER.						FROM PERMANENT GRASS.					
	Total Produce in 1932.	Acreage in 1932.	Yield per Acre.			Average of the Ten Years, 1922-1931.	Total Produce in 1932.	Acreage in 1932.	Yield per Acre.			Average of the Ten Years, 1922-1931.
			1932.	1931.	1930.				1932.	1931.	1930.	
	Tons.	Acres.	Cwt.	Cwt.	Cwt.	Cwt.	Tons.	Acres.	Cwt.	Cwt.	Cwt.	Cwt.
Aberdeen	63,000	54,071	23.3	28.6	24.1	27.6	1,940	1,880	20.5	21.2	18.3	22.3
Angus	45,000	22,317	40.3	39.2	37.5	37.4	2,560	1,541	32.8	30.0	30.8	30.1
Argyll	16,000	12,067	27.3	32.4	30.6	30.6	18,860	14,849	24.8	27.9	27.7	28.9
Ayr	42,000	25,425	32.6	33.3	32.1	32.5	45,000	20,729	43.6	42.7	42.4	41.3
Banff	15,000	11,030	27.7	29.4	27.9	29.7	500	467	21.5	21.2	20.6	21.5
Berwick	22,000	11,456	37.7	33.4	31.4	34.6	5,360	3,235	33.3	31.0	28.4	27.1
Bute	4,000	2,243	35.6	35.4	35.6	36.2	640	388	33.2	32.4	33.2	33.5
Caithness	9,000	9,731	18.5	18.8	15.2	18.2	560	1,477	7.6	9.1	8.0	8.5
Clackmannan	3,100	1,149	54.3	45.8	47.8	44.5	4,470	1,596	56.3	58.2	57.2	48.0
Dumfries	33,000	19,325	34.2	35.8	32.6	31.9	28,400	19,850	29.1	29.8	28.6	29.2
Dunbarton	8,600	4,762	36.3	40.8	41.6	33.0	4,200	2,450	34.6	39.9	41.2	35.9
East Lothian	22,000	8,622	50.4	48.2	50.1	49.2	1,740	1,198	29.1	29.6	30.5	34.7
Fife	62,000	24,431	50.9	50.2	41.9	41.4	9,100	4,318	42.2	37.8	34.8	33.4
Inverness	11,000	11,391	20.1	22.3	21.0	22.3	7,005	10,664	13.1	18.5	13.7	19.4
Kincardine	21,000	12,746	32.2	36.8	31.8	35.6	500	401	25.0	27.8	24.5	29.2
Kinross	7,300	2,846	51.4	42.4	40.0	40.1	1,630	828	39.4	34.4	34.4	36.1
Kirkcudbright	14,000	10,424	26.6	29.0	25.7	27.2	17,800	12,988	27.1	26.9	25.2	25.4
Lanark	52,000	29,305	35.2	36.8	32.2	35.2	22,600	13,039	35.0	34.2	30.2	32.9
Mid-Lothian	25,000	10,222	48.4	47.4	48.0	47.6	2,600	1,630	32.4	31.2	34.3	35.8
Moray	12,000	6,404	35.9	20.7	19.4	21.6	151	144	20 5	19.2	18.8	18.2
Nairn	1,700	1,775	19.7	21.7	18.7	20.5	70	103	14.3	15.1	14.0	16.4
Orkney	20,000	11,067	36.7	36.8	34.2	25.3	990	1,133	17.5	14.4	14.4	11.7
Peebles	4.600	2,513	36.5	39.4	32.9	34 6	1,580	1,204	26.5	27.8	28.7	31.0
Perth	49,000	31,155	31.3	32.1	28.1	31.0	19,400	12,388	30.8	31.4	29.9	29.5
Renfrew	15,000	7,112	43.5	43.1	41.8	40.8	13,900	5,826	49.1	42.2	43.5	42.7
Ross and Cromarty	13,000	12,212	21.2	25.0	21.2	21.7	3,004	3,467	17.3	19.4	16.2	16.5
Roxburgh	16,000	10,080	32.6	29.6	31.8	33.5	9,900	7,786	25.3	22.8	29 5	31.4
Selkirk	1,900	1,364	28.1	28.6	27.2	36.0	2,410	2,095	23.3	24.6	29 3	36.0
Stirling	16,000	9,314	34.8	37.1	42.4	40.6	20,100	8,324	47.6	50.7	50.8	46.2
Sutherland	4,000	4,503	19.8	22.3	18.2	20.1	1,500	1,787	16.4	18.4	16.2	16.9
West Lothian	15,000	6,155	49.2	48.3	49.9	46.5	1,950	932	42.4	37.3	49.8	41.5
Wigtown	13,000	8,083	33.3	32.9	23.1	30.9	8,700	5,631	30.7	31.1	30.4	30.6
Zetland	2,300	1,813	25 2	29.5	28.9	27.8	1,800	2,106	17.2	18.2	20.3	18.5
Total	658,500	397,116	33.2	34.4	31·7	32.8	260,920	166,454	31.4	32.1	31.5	31.8

N.B.—*The figures given above are those for* 1932, *which appeared in last volume. The figures for* 1933 *were not available at the time of going to press.*

TABLE No. 7.—HAY from Permanent Grass:—TOTAL PRODUCE, ACREAGE, and YIELD PER ACRE, in 1932, in each COUNTY OF SCOTLAND, distinguishing HAY from TIMOTHY MEADOWS and HAY from OTHER MEADOWS.

COUNTIES	TIMOTHY MEADOWS.			OTHER MEADOWS.		
	Total Produce in 1932.	Acreage in 1932.	Yield per Acre in 1932.	Total Produce in 1932.	Acreage in 1932.	Yield per Acre in 1932.
	Tons.	Acres.	Cwt.	Tons.	Acres.	Cwt.
Aberdeen	40	20	36·0	1,900	1,860	20·3
Angus	360	180	39·7	2,200	1,361	31·9
Argyll	860	540	31·7	18,000	14,809	24·5
Ayr	28,000	11,251	49·4	17,000	9,478	36·7
Banff	..	..	..	500	467	21·5
Berwick	160	103	31·6	5,200	3,132	33·4
Bute	150	83	36·5	490	305	32·3
Caithness	..	..	..	560	1,477	7·6
Clackmannan	3,500	1,182	59·6	970	414	46·8
Dumfries	6,400	3,882	33·1	22,000	15,968	28·1
Dunbarton	1,700	779	43·9	2,500	1,671	30·2
East Lothian	440	175	50·4	1,300	1,023	25·4
Fife	4,200	1,488	55·9	4,900	2,830	35·0
Inverness	5	4	26·0	7,000	10,660	13·1
Kincardine	..	..	..	500	401	25·0
Kinross	690	263	52·7	940	565	33·3
Kirkcudbright	4,800	2,510	38·1	13,000	10,478	24·4
Lanark	14,000	6,998	40 6	8,600	6,046	28·5
Mid-Lothian	1,300	560	48·2	1,300	1,070	24·1
Moray	11	5	45.0	140	139	19·6
Nairn	..	..	..	70	103	14·3
Orkney	..	..	..	990	1,133	17·5
Peebles	580	289	40·2	1,000	915	22·2
Perth	8,400	3,707	45·3	11,000	8,681	24·6
Renfrew	10,000	3,994	51·9	3,900	1,832	43·1
Ross and Cromarty	4	3	26·0	3,000	3,464	17·3
Roxburgh	400	279	29·0	9,500	7,507	25·2
Selkirk	110	85	26·4	2,300	2,010	23·1
Stirling	17,000	5,997	55·6	3,100	2,327	26·9
Sutherland	..	..	..	1,500	1,787	16·4
West Lothian	1,600	604	53·7	350	328	21·7
Wigtown	1,900	944	39·4	6,800	4,687	28·9
Zetland	..	..	.	1,800	2,106	17·2
Total	106,610	45,920	46·5	154,310	120,534	25·6

N.B.—*The figures given above are those for* 1932, *which appeared in last volume. The figures for* 1933 *were not available at the time of going to press.*

TABLE No. 8.—NUMBER OF HORSES, CATTLE, SHEEP, AND PIGS IN EACH COUNTY OF SCOTLAND AS RETURNED ON 4TH JUNE 1932.

Counties.	Horses (including Ponies).					Cattle.							Sheep.				Pigs.		
	Used solely for Agriculture, &c.*	Stallions.†	Unbroken Horses.		Other Horses.	Cows in Milk.	Cows in Calf, but not in Milk.	Heifers in Calf.	Bulls used for Service.	Other Cattle.			Ewes kept for Breeding.	Rams to be used for Service.	1 Year Old and above.	Under 1 Year.	Sows kept for Breeding.	Boars used for Service.	Other Pigs.
			1 Year & above.	Under 1 Year.						2 Years & above.	1 Year & under 2 Years.	Under 1 Year.							
1. Aberdeen	17,856	48	2,632	922	2,144	37,157	3,611	2,825	1,689	33,456	51,796	37,554	167,293	5,109	44,817	212,213	2,453	251	17,313
2. Angus	6,663	1	316	111	475	10,050	999	839	448	15,466	14,001	8,535	89,869	2,935	21,870	102,232	1,087	127	6,935
3. Argyll	3,489	7	474	159	352	15,978	2,374	1,895	839	6,600	9,846	13,147	349,601	10,491	97,198	259,795	411	53	3,383
4. Ayr	5,810	26	761	290	761	41,350	7,549	12,351	2,408	8,853	20,970	22,225	187,706	4,910	45,841	175,725	1,145	99	10,269
5. Banff	5,137	9	875	299	554	10,524	1,093	704	524	4,993	12,501	10,978	46,731	1,431	13,555	55,433	856	95	5,104
6. Berwick	3,040	11	304	96	481	4,071	814	1,100	327	5,411	8,820	5,148	151,818	3,793	40,212	214,892	706	106	3,734
7. Bute	769	3	117	47	99	2,533	413	623	181	1,149	2,105	2,129	21,130	617	6,632	16,797	57	6	532
8. Caithness	3,454	9	495	183	359	5,667	620	361	149	1,586	4,705	5,503	79,975	2,222	22,760	90,191	184	22	1,218
9. Clackmannan	371	3	59	20	69	1,156	216	150	60	810	1,044	551	5,907	205	803	5,966	65	10	397
10. Dumfries	4,279	9	676	272	690	19,881	3,101	6,277	1,264	9,289	16,726	17,716	263,546	6,828	63,934	255,651	1,340	107	7,870
11. Dunbarton	1,013	19	122	43	120	5,036	1,259	1,075	291	1,142	2,401	2,285	34,202	1,069	9,458	27,537	134	15	1,169
12. East Lothian	2,488	3	202	47	149	2,540	360	405	157	5,794	4,904	2,368	62,824	1,713	26,286	82,632	541	65	8,017
13. Fife	5,713	21	714	233	695	11,105	2,074	1,678	660	10,881	12,977	9,180	65,419	2,022	13,355	83,946	1,233	175	7,215
14. Inverness	5,158	24	512	171	499	15,957	2,654	1,229	538	3,336	7,665	11,504	241,991	6,752	74,327	183,578	254	40	1,591
15. Kincardine	3,184	7	301	92	466	5,753	505	417	345	5,853	9.066	5,550	32,261	958	5,559	39,352	306	37	2,897
16. Kinross	661	1	120	36	34	1,380	230	216	84	772	2,115	1,244	15,396	523	3,728	16,367	69	9	619
17. Kirkcudbright	2,768	15	478	189	295	17,180	1,592	5,965	980	8,413	14,480	12,311	176,028	4,908	48,230	173,720	1,051	131	10,585
18. Lanark	4,910	31	532	187	579	26,991	7,170	6,191	1,666	7,069	12,221	12,362	108,839	2,964	30,767	103,505	915	90	6,811
19. Mid-Lothian	2,442	6	154	48	375	7,139	976	665	249	3,334	4,145	2,491	79,815	1,868	27,323	93,336	1,713	155	11,423
20. Moray	3,038	20	440	106	216	5,958	581	419	243	3,639	7,857	5,395	24,063	594	6,693	25,589	487	45	4,129
21. Nairn	806	1	122	49	153	1,910	160	145	108	451	1,801	2,039	6,360	222	3,585	6,168	139	15	715
22. Orkney	4,617	21	589	273	742	9,525	1,153	910	251	4,350	10,346	9,682	27,009	773	5,930	35,825	178	22	1,518
23. Peebles	594	1	52	24	82	1,723	299	488	155	1,121	1,758	1,487	96,420	2,311	19,909	93,324	74	14	556
24. Perth	7,811	38	775	239	787	15,229	2,156	2,132	912	11,690	21,191	16,640	304,483	9,239	74,795	268,960	1,032	123	7,077
25. Renfrew	1,652	10	131	62	285	10,379	2,688	2,322	619	1,740	3,698	3,714	21,310	635	5,236	21,039	418	47	3,954
26. Ross & Cromarty	4,677	5	465	118	457	13,611	2,075	1,181	395	3,421	7,582	7,684	148,629	4,163	63,152	129,106	432	50	2,628
27. Roxburgh	2,627	8	275	58	592	5,149	863	955	360	6,241	7,084	5,421	237,095	5,883	64,571	281,362	380	40	2,414
28. Selkirk	424	1	41	9	69	1,098	185	163	75	490	1,088	972	86,612	2,007	19,314	83,702	44	3	833
29. Stirling	2,565	13	325	132	374	8,529	2,211	2,012	535	6,219	9,084	5,464	60,002	1,692	15,205	55,238	349	39	2,455
30. Sutherland	1,536	5	89	25	129	3,479	608	250	75	504	1,663	1,856	91,901	2,331	40,896	76.572	33	5	392
31. West Lothian	1,328	5	201	47	158	4,036	907	607	234	2,453	2,485	2,064	9,910	239	3,844	12,830	355	36	2,308
32. Wigtown	3,159	15	655	254	296	24,939	1,231	3,848	1,077	7,880	10,294	11,942	67,383	2,095	15,876	69,782	1,324	149	13,105
33. Zetland	1,657	12	169	59	1,474	4,227	631	307	58	716	1,825	2,407	81,035	2,631	27,300	62,302	7	2	204
Total	115,696	408	14,173	4,900	14,920	351,290	53,458	60,705	17,956	190,122	300,184	259,548	3,442,613	96,133	962,961	3,414,717	19,772	2,183	143,870

* Including Mares kept for breeding.

† Above two years old used, or intended to be used, for service.

N.B.—*The figures given above are those for* 1932, *which appeared in last volume. The figures for* 1933 *were not available at the time of going to press.*

TABLE No. 9.—QUANTITY AND VALUE OF CORN, &c., imported into the United Kingdom in the undermentioned Years.

[*From Trade and Navigation Returns.*]

	Quantities.			Values.		
	1931.	1932.	1933.	1931.	1932.	1933.
	Cwt.	Cwt.	Cwt.	£	£	£
Wheat from—						
Soviet Union (Russia)	28,930,956	3,274,960	5,769,887	6,596,355	906,030	1,362,533
United States . .	11,241,671	4,635,671	5,046	3,014,448	1,462,509	1,382
Argentine Republic .	20,733,799	20,616,317	24,698,928	5,074,310	6,146,846	6,191,257
British India . .	481,665	..	.	133,302	..	..
Australia . . .	23,299,598	24,116,182	29,288,892	6,058,693	7,605,837	8,377,586
Canada . . .	27,097,560	46,853,419	45,572,295	7,688,531	14,627,993	13,510,516
Other countries . .	7,633,333	6,140,585	7,056,260	1,810,451	1,725,002	1,564,728
Total . .	119,418,582	105,637,134	112,391,308	30,376,090	32,474,217	31,007,952
Wheat, meal, and flour, from—						
France . . .	1,012,956	440,077	1,397,044	275,056	137,704	352,420
United States . .	2,077,583	461,997	118,265	905,152	236,867	62,395
Argentine Republic .	717,127	478,114	363,340	188,481	137,185	98,605
Australia . . .	2,558,335	2,831,623	2,733,258	875,892	1,068,318	994,541
Canada . . .	3,894,610	3,974,075	4,326,048	1,639,683	1,849,552	1,859,236
Other countries . .	486,477	343,646	905,705	151,124	104,405	190,060
Total . .	10,747,088	8,529,532	9,843,660	4,035,388	3,534,031	3,557,257
Barley	15,423,116	10,178,118	15,974,958	4,136,233	2,973,615	3,745,351
Oats	8,753,194	6,471,849	5,613,756	1,923,767	1,836,423	1,207,181
Peas, not fresh . .	1,705,168	1,488,442	1,582,795	1,142,643	1,296,080	1,328,458
Beans, not fresh . .	927,426	959,609	1,050,270	502,132	497,171	439,867
Maize	53,261,331	52,746,019	51,304,896	9,919,098	11,466,020	10,262,275
Maize products . .	2,184,754	2,954,085	2,121,845	665,403	843,941	590,659
Oat products . . .	879,905	784,005	714,179	760,059	722,486	522,748
Rice—						
From Spain . .	477,055	437,361	29,065	293,543	304,763	17,193
From United States .	336,138	297,850	128,384	318,782	275,771	101,704
From British India .	885,971	1,148,539	1,358,223	342,460	475,823	497,607
From other countries	700,340	573,817	625,978	304,674	338,878	264,635
Other kinds of grain .	339,001	245,222	339,318	113,898	99,128	120,401
Other products . .	548,025	510,907	967,683	430,863	399,140	886,194
Malt	33,183	28,106	23,598	29,266	25,347	20,053
Farinaceous substances not elsewhere specified	830,596	997,521	943,598	523,738	515,550	453,844
Total of corn, &c.	87,285,203	79,816,450	82,778,546	21,406,559	22,070,131	20,453,170

TABLE No. 10.—RETURN OF THE AVERAGE PRICES OF WOOL in the Years 1932 and 1933.

Years.	Australian.	South African.	English Fleeces.
	Per lb. *s.* *d.*	Per lb. *s.* *d.*	Per lb. *s.* *d.* *s.* *d.*
1932	0 9	0 9¼	0 5¼ to 0 9¾
1933	0 10	0 9¾	0 6½ ,, 1 0½

TABLE No. 11.—QUANTITIES AND VALUES OF CORN, MEAT, FOOD PRODUCTS, AND ARTICLES AFFECTING AGRICULTURE, imported into the United Kingdom in the Year 1933, with the Corresponding Figures for 1931 and 1932.

[From Trade and Navigation Returns.]

	Quantities.			Values.		
	1931.	1932.	1933.	1931.	1932.	1933.
ANIMALS, LIVING:—	No.	No.	No.	£	£	£
Cattle	766,523	642,611	633,607	12,615,945	8,944,010	6,362,838
Sheep and lambs	561,165	440,871	318,299	1,186,106	677,433	343,180
Pigs	478,941	302,760	143,970	2,212,612	1,035,782	300,354
Total value	1,806,629	1,386,242	1,095,876	16,014,663	10,657,225	7,006,372
GRAIN, FLOUR, &c.:—	Cwt.	Cwt.	Cwt.	£	£	£
Wheat	119,418,582	105,637,134	112,391,308	30,376,090	32,474,217	31,007,952
Wheat meal and flour	10,747,088	8,529,532	9,843,660	4,085,388	3,534,031	3,557,257
Barley	15,423,116	10,178,118	15,974,958	4,136,233	2,973,615	3,745,351
Oats	8,753,194	6,471,840	5,613,756	1,923,767	1,836,423	1,207,181
Peas, not fresh	1,705,168	1,488,442	1,582,705	1,142,643	1,296,080	1,323,458
Beans, not fresh	927,426	959,609	1,050,270	502,132	497,171	439,867
Maize or Indian corn	53,261,331	52,746,019	51,304,896	9,916,098	11,466,020	10,262,275
Maize products	2,184,764	2,954,085	2,121,845	665,403	843,941	590,659
Oat products	879,905	784,005	714,179	760,059	722,486	522,748
All other products	548,025	510,907	967,683	430,863	399,140	886,194
Malt	33,183	28,106	23,598	29,266	25,347	20,053
Rice	2,399,504	2,452,567	2,141,650	1,259,459	1,395,235	881,139
Other kinds of grain	339,001	245,222	339,318	113,898	99,123	120,401
Farinaceous substances not elsewhere specified	830,596	997,521	943,598	523,738	515,550	453,844
Total value	217,450,873	193,983,116	205,013,514	55,818,037	58,078,379	55,018,379
MEAT:—	Cwt.	Cwt.	Cwt.	£	£	£
Beef, salted	5,840	4,253	3,650	13,012	7,230	7,628
*Beef	11,989,438	11,365,588	11,118,498	25,492,122	22,777,578	19,387,278
*Mutton	7,132,286	6,934,823	6,698,443	18,367,997	15,681,640	15,526,408
Bacon	11,133,676	11,390,839	9,084,933	33,129,521	30,189,052	29,934,507
Hams	831,149	801,349	869,483	3,217,422	2,723,993	3,067,208
Pork, salted (not bacon or hams)	66,908	34,238	21,003	109,271	50,325	41,704
*Pork	748,504	603,172	817,824	2,432,129	1,638,722	2,078,437
Tinned, canned extracts, including tongue	1,469,051	1,133,265	1,283,172	6,122,686	3,911,825	3,992,085
All other kinds	397,789	415,006	451,734	909,227	887,491	890,891
*Rabbits (dead)	388,732	576,570	492,009	715,585	763,847	609,848
Total of dead meat	34,163,373	33,258,603	30,840,749	90,508,922	78,631,703	75,535,994
DAIRY PRODUCE:—	Cwt.	Cwt.	Cwt.	£	£	£
Butter	8,060,068	8,364,867	8,834,514	46,297,585	41,055,142	34,437,081
Margarine	692,951	92,411	32,513	1,924,024	199,165	52,300
Cheese	2,885,794	3,003,113	3,039,667	9,062,707	9,089,757	7,612,100
Milk, condensed, unsweetened	483,579	397,229	380,625	1,084,253	831,454	758,980
Milk, condensed, sweetened	229,646	205,413	144,870	451,516	343,510	237,024
Milk, separated or skimmed	2,085,535	2,138,756	1,917,878	2,801,348	2,433,411	2,083,942
Total	14,437,573	14,201,289	14,350,067	61,621,433	53,952,439	45,181,427
	Gt. Hunds.	Gt. Hunds.	Gt. Hunds.	£	£	£
EGGS in Shell	25,925,201	19,994,675	18,873,884	13,773,082	9,063,620	7,305,158
	Cwt.	Cwt.	Cwt.			
EGGS not in Shell	300,760	301,121	657,113	2,878,421	2,764,896	1,920,372
Total value	..	..	..	16,651,503	11,828,516	9,225,530

* Fresh, Chilled, and Frozen.

TABLE No. 11—*Continued.*

	Quantities.			Values.		
	1931.	1932.	1933.	1931.	1932.	1933.
				£	£	£
POULTRY (alive or dead) . .	..	..	..	3,319,662	2,868,297	2,009,056
GAME (alive or dead) . .	..	..	..	76,664	88,405	71,421
Total value .	..	..	..	3,396,326	2,456,702	2,080,477
FRUIT, VEGETABLES, &c. :—	Cwt.	Cwt.	Cwt.	£	£	£
Apples	7,598,533	8,090,780	7,459,188	7,879,044	7,830,110	6,987,189
Cherries	58,583	12,059	4,449	148,575	39,469	18,272
Plums, Greengages, Damsons	513,265	343,869	264,970	920,764	642,378	547,657
Pears	1,237,242	1,112,221	1,182,613	1,758,499	1,473,418	1,539,070
Grapes	944,258	902,927	782,503	1,886,471	1,522,460	1,458,869
Oranges	10,391,489	9,342,590	11,562,495	9,548,850	7,594,372	8,087,124
Lemons, Limes, &c. . .	1,409,624	1,448,244	1,816,964	1,256,518	1,283,967	1,024,840
Bananas	Bunches. 16,161,900	Bunches. 17,107,535	Bunches. 15,931,347	5,538,633	4,429,506	4,351,134
Fruit (unenumerated) .	Cwt. 1,771,590	Cwt. 1,535,755	Cwt. 1,418,826	2,739,289	2,152,891	2,007,980
Onions	Bushels. 10,170,550	Bushels. 10,040,074	Bushels. 10,111,446	1,756,018	1,837,217	1,241,508
Potatoes	Cwt. 16,653,210	Cwt. 15,560,396	Cwt. 3,928,237	6,961,841	5,748,787	2,063,407
Tomatoes	2,936,436	2,432,115	2,902,897	4,563,718	4,311,069	4,818,608
Vegetables, unenumerated (raw)	..	..	..	1,691,012	1,059,779	871,511
Total value .	..	..	..	46,648,732	39,925,423	34,517,114
OTHER ARTICLES :—	Tons.	Tons.	Cwt.	£	£	£
Lard	127,435	122,174	2,881,446	5,910,839	4,812,356	4,960,619
Wool—sheep and lambs' .	Centals. 8,482,287	Centals. 9,183,078	Centals. 9,521,205	32,715,067	32,482,743	35,650,936
Wood and timber—	Loads.	Loads.	Loads.			
Pit-props or pit-wood .	1,900,175	1,917,450	1,913,997	3,070,289	2,927,646	2,778,392
Sawn soft	4,265,838	4,222,121	5,602,530	14,679,222	13,056,690	17,161,760
Staves	45,492	26,125	42,640	368,743	196,401	227,913
Oilseed-cake and meal .	Tons. 458,626	Tons. 423,452	Tons. 384,653	2,394,653	2,314,338	2,040,423
Seeds—	Cwt.	Cwt.	Cwt.			
Clover and grass . .	254,604	246,588	238,634	595,944	519,667	450,397
Cotton	Tons. 502,258	Tons. 428,842	Tons. 457,875	2,804,850	2,595,713	2,614,363
Flax or linseed . .	338,156	362,316	245,925	3,157,294	3,057,891	2,453,374
Rape	21,931	24,807	20,822	182,662	257,939	200,994
Soya beans	110,300	160,569	157,489	725,558	1,116,767	1,060,581
Bones (whether burnt or not)	5,429	6,336	7,325	31,354	36,460	40,022
Guano	7,920	12,844	9,848	65,450	82,021	60,864
Basic slag	49,421	9,736	1,468	106,128	19,399	2,486
Superphosphates . . .	112,085	58,700	83,532	269,458	132,241	72,439
Phosphate of lime and rock phosphate	258,692	352,862	342,523	338,926	458,881	429,675
Nitrate of soda . . .	Cwt. 1,619,293	Cwt. 222,793	Cwt. 38,978	656,958	76,574	9,124
Cotton, raw of 100 lb.	Centals. 10,906,188	Centals. 12,575,630	Centals. 14,029,736	26,270,817	30,384,037	35,830,810
Hemp	Tons. 84,609	Tons. 64,864	Tons. 74,469	1,769,221	1,286,647	1,464-393
Flax	43,217	48,635	50,643	1,912,454	2,200,121	2,546,741
Hides untanned—	Cwt.	Cwt.	Cwt.			
Dry	396,408	351,548	496,605	1,112,126	898,501	1,809,630
Wet	877,347	907,872	948,803	2,213,097	1,865,140	2,162,860
Petroleum (refined) . .	Gallons. 1,862,856,944	Gallons. 1,880,311,404	Gallons. 2,065,807,409	26,022,044	27,844,168	27,032,689
Petroleum (crude) . .	344,870,004	368,502,111	391,563,021	2,974,562	3,357,242	3,310,895

TABLE No. 12.—*QUANTITY AND VALUE OF DEAD MEAT imported into the United Kingdom in the undermentioned Years.*

	Quantities.			Values.		
	1931.	**1932.**	**1933.**	**1931.**	**1932.**	**1933.**
BACON, from—	Cwt.	Cwt.	Cwt.	£	£	£
Lithuania . . .	362,381	512,007	415,526	876,978	1,181,320	1,201,681
Sweden . . .	576,924	423,670	402,634	1,706,589	1,101,765	1,332,157
Denmark . . .	7,339,195	7,670,349	5,524,497	22,393,767	20,941,299	19,128,938
Poland . . .	1,076,610	1,155,389	783,758	2,704,807	2,658,606	2,293,116
Netherlands . .	999,900	975,578	871,950	2,883,047	2,425,219	2,678,234
United States . .	189,027	63,807	62,931	620,623	188,039	170,964
Irish Free State .	296,841	200,095	204,303	1,155,183	633,959	612,552
Canada . . .	49,495	181,580	506,113	150,397	524,988	1,599,718
Other countries . .	248,303	228,369	313,221	638,130	588,907	922,152
Total . .	11,133,676	11,390,839	9,034,933	33,129,521	30,189,052	29,934,507
BEEF (salted)—						
Total . .	5,840	4,253	3,650	13,012	7,230	7,628
BEEF (fresh and refrigerated)—						
United States . .	60,297	47,616	50,180	242,437	189,954	154,622
Uruguay . . .	1,017,796	700,715	673,471	2,131,410	1,412,011	1,175,374
Argentine Republic .	8,570,147	8,460,638	7,645,174	19,039,267	17,086,122	14,183,187
Australia . . .	1,136,278	956,261	1,164,035	1,837,933	1,416,703	1,557,878
New Zealand . .	382,178	579,125	706,750	595,312	776,120	894,479
Other countries . .	822,742	621,233	878,938	1,645,763	1,296,668	1,421,738
Total . .	11,989,438	11,365,588	11,118,498	25,492,122	22,777,578	19,387,278
HAMS, from—						
United States . .	600,631	465,289	564,048	2,381,476	1,645,579	2,004,497
Canada . . .	72,488	142,867	180,639	297,895	503,521	657,842
Other countries . .	158,030	193,193	124,796	538,051	574,893	404,869
Total . .	831,149	801,349	864,483	3,217,422	2,723,993	3,067,208
TINNED, CANNED EXTRACTS—						
Beef	1,140,439	804,912	923,556	4,300,799	2,553,359	2,564,062
Mutton . . .	47,363	39,573	53,996	166,040	126,588	146,768
Pork	165,293	146,316	174,856	1,283,988	848,871	947,269
,, Other descriptions	115,956	142,464	130,764	371,809	383,007	383,986
Total . .	1,469,051	1,133,265	1,283,172	6,122,636	3,911,825	3,992,085
ALL OTHER KINDS—						
Tinned or Canned .	30,500	29,876	38,224	153,666	130,385	134,626
Salted . . .	205	20	..	463	55	..
Other descriptions .	367,084	385,110	413,510	755,098	757,051	756,265
Total . .	397,789	415,006	451,734	909,227	887,491	890,891
MUTTON (fresh and refrigerated)—						
Uruguay . . .	284,300	162,869	171,958	707,282	373,700	369,234
Argentine Republic .	1,553,309	1,371,650	1,146,601	3,758,619	2,913,179	2,499,658
Australia . . .	1,529,345	1,152,092	1,306,666	3,595,650	2,495,618	2,915,264
New Zealand . .	3,469,761	3,906,842	3,734,462	9,634,502	9,237,657	9,050,059
Other countries . .	295,571	340,870	338,756	671,944	661,486	692,193
Total . .	7,132,286	6,934,323	6,698,443	18,367,997	15,681,640	15,526,408
PORK (salted)—						
Total . .	66,908	34,238	21,003	109,271	50,325	41,704
PORK (fresh and refrigerated)—						
Irish Free State .	382,899	262,151	194,695	1,258,626	706,499	498,634
New Zealand . .	121,803	131,142	278,082	351,563	316,596	662,400
Argentine Republic .	81,220	108,854	166,356	277,521	317,259	417,046
United States . .	62,273	32,978	83,322	247,451	114,298	257,563
Other countries . .	100,309	68,047	95,369	296,968	184,070	242,794
Total . .	748,504	603,172	817,824	2,432,129	1,638,722	2,078,437
RABBITS (dead), from—						
Belgium . . .	25,630	17,865	13,825	128,797	91,128	73,491
Irish Free State .	13,720	4,754	1,018	39,988	12,213	1,341
Australia . . .	315,332	515,016	435,645	475,865	586,232	465,528
New Zealand . .	27,900	31,167	35,755	43,071	42,665	42,569
Other countries .	6,150	7,768	5,766	27,864	31,609	26,919
Total . .	388,732	576,570	492,009	715,585	763,847	609,848
Total of dead meat	34,163,373	33,258,603	30,840,749	90,508,922	78,631,703	75,535,994

TABLE No. 13.—QUANTITIES AND VALUES OF BUTTER, MARGARINE, CHEESE, AND EGGS imported into the United Kingdom in each Year from 1931 to 1933 inclusive.

[From Trade and Navigation Returns.]

	Quantities.			Values.		
	1931.	1932.	1933.	1931.	1932.	1933.
BUTTER from—	Cwt.	Cwt.	Cwt.	£	£	£
Soviet Union (Russia) .	404,369	322,887	562,696	1,969,244	1,234,886	1,704,018
Finland . .	254,071	216,620	133,811	1,486,898	1,080,170	521,152
Estonia . .	125,384	83,153	83,361	666,984	337,916	266,236
Sweden . .	211,733	175,771	226,777	1,272,517	892,011	860,446
Denmark .	2,466,070	2,583,664	2,519,119	15,639,722	13,432,387	10,695,544
Netherlands .	96,117	46,990	145,770	598,349	248,867	576,329
Argentine Republic . .	373,934	391,027	202,451	2,047,282	1,664,763	709,005
Irish Free State	381,028	314,663	378,662	2,111,488	1,433,878	1,073,676
Australia .	1,557,952	1,795,465	1,693,545	8,350,206	8,618,438	6,532,537
New Zealand .	1,925,611	2,140,280	2,512,447	10,773,553	10,857,148	10,194,961
Other countries	263,799	293,847	375,875	1,381,342	1,254,678	1,303,177
Total .	8,060,068	8,364,367	8,834,514	46,297,585	41,055,142	34,437,081
MARGARINE from—	Cwt.	Cwt.	Cwt.	£	£	£
Netherlands .	661,138	72,509	22,978	1,836,890	151,027	36,306
Irish Free State	17,280	15,516	8,170	51,108	37,578	12,502
Other countries	14,533	4,386	1,365	36,026	10,560	3,492
Total .	692,951	92,411	32,513	1,924,024	199,165	52,300
CHEESE from—	Cwt.	Cwt	Cwt.	£	£	£
Netherlands .	168,219	170,034	122,179	573,934	454,680	282,364
Italy . .	131,783	106,094	90,311	637,034	449,083	339,954
Australia .	68,036	73,534	92,476	193,348	210,975	219,776
New Zealand .	1,732,620	1,849,132	2,059,393	4,947,571	5,435,623	4,888,002
Canada . .	706,725	747,478	629,715	2,322,269	2,266,070	1,665,669
Other countries	78,411	56,841	45,593	388,551	273,326	216,335
Total .	2,885,794	3,003,113	3,039,667	9,062,707	9,089,757	7,612,100
EGGS from—	Great Hundreds.	Great Hundreds.	Great Hundreds.	£	£	£
Soviet Union (Russia) .	262,444	87,174	55,731	83,688	23,377	14,429
Sweden . .	339,003	362,213	202,029	184,710	171,755	104,020
Denmark .	7,548,661	6,392,302	6,233,637	4,406,132	2,970,200	2,551,463
Poland (including Dantzig)	2,687,069	1,874,311	1,680,894	1,015,020	624,773	508,485
Netherlands .	3,839,248	1,402,979	1,002,841	2,270,342	649,588	406,624
Belgium . .	2,072,937	1,583,777	449,153	1,154,797	738,061	222,334
France . .	96,680	18,653	252	52,528	9,698	132
Egypt . .	220,937	246,047	100,691	71,589	76,240	31,162
China . .	1,497,184	850,023	1,396,459	646,586	347,426	602,759
Irish Free State	4,575,107	3,948,328	3,437,028	2,269,568	1,701,868	998,261
British South Africa . .	589,302	527,787	454,939	418,974	349,385	270,930
Australia .	918,206	1,515,542	1,899,608	582,213	894,610	1,024,547
Other countries	1,278,423	1,185,539	1,460,622	616,935	506,639	570,012
Total . .	25,925.201	19.994,675	18.373,884	13.773,082	9,063,620	7,305,158
MILK—						
Condensed, Unsweetened .	Cwt. 483,579	Cwt. 397,229	Cwt. 380,625	£ 1,084,253	£ 831,454	£ 758,980
Condensed, Sweetened from						
For. countries	218,459	169,627	117,504	422,980	273,999	186,447
Brit. countries	11,187	35,786	27,366	28,536	69,511	50,577
Separated or Skimmed from						
For. countries	2,046,708	2,088,509	1,833,216	2,741,831	2,389,049	2,008,753
Brit. countries	38,827	50,247	84,662	59,517	44,362	75,189
Total .	2,798,760	2,741,398	2,443,373	4,337,117	3,608,375	3,079,946

TABLE No. 14.—NUMBER AND VALUE OF LIVE CATTLE, SHEEP, AND PIGS imported into the United Kingdom in the undermentioned Years. [*From Trade and Navigation Returns.*]

	Number.			Value.		
	1931.	1932.	1933.	1931.	1932.	1933.
CATTLE, from—	No.	No.	No.	£	£	£
Irish Free State . .	738,967	625,887	582,174	12,048,496	8,597,784	5,494,547
Canada	26,991	16,724	51,433	553,749	346,226	868,291
Other countries . .	565	..	..	13,700	..	..
Total . . .	766,523	642,611	633,607	12,615,945	8,944,010	6,362,838
SHEEP AND LAMBS, from—						
Irish Free State . .	561,165	440,871	318,299	1,186,106	677,433	343,180
Other countries . .	..	..	..	..	..	..
Total . . .	561,165	440,871	318,299	1,186,106	677,433	343,180
PIGS, from—						
Irish Free State . .	478,941	302,760	143,970	2,212,612	1,035,782	300,354
Other countries . .	..	..	..	..	..	..
Total . . .	478,941	302,760	143,970	2,212,612	1,035,782	300,354

TABLE No. 15.—NUMBER OF HORSES, CATTLE, SHEEP, AND PIGS imported into Great Britain from Ireland in each of the Years 1927-1933.

	1927.	1928.	1929.	1930.	1931.	1932.	1933.
†HORSES :—							
Stallions . .	457	480	495	467	407	367	333
Mares . .	4,655	4,290	3,952	4,037	3,862	3,699	3,905
Geldings . .	5,855	4,956	4,395	4,528	4,101	4,029	5,033
Total . .	10,967	9,726	8,842	9,032	8,370	8,095	9,271
CATTLE: Oxen, Bulls, and Cows :—							
Fat . . .	284,498	319,983	339,512	301,128	268,677	223,901	238,036
Store . . .	348,723	419,682	414,308	511,249	431,659	404,169	368,214
Other cattle .	53,679	65,267	71,081	81,609	67,806	55,633	44,732
Calves . .	25,892	49,255	57,618	72,155	65,298	61,201	58,352
Total . .	712,792	854,187	882,469	966,141	833,440	744,904	709,334
SHEEP :—							
Sheep . . .	273,383	269,675	250,328	260,711	316,847	227,975	169,937
Lambs . .	367,660	401,062	412,456	389,446	355,448	350,588	282,964
Total . .	641,048	670,737	662,784	650,157	672,295	578,563	452,901
PIGS :—							
Fat . . .	338,961	293,355	265,147	355,166	424,067	241,458	119,691
Store . . .	4,871	1,492	3,648	3,557	5,393	3,580	3,123
Total . .	343,832	294,847	268,795	358,723	429,460	245,038	122,814

† Not including Army Horses.

EDINBURGH CORN MARKET.

STATEMENT SHOWING THE PRICES OF WHEAT, BARLEY, AND OATS FOR THE YEAR 1933.

The offering of grain by farmers and others in the area of the Market was not resumed during the year. It is hoped that advantage will be taken of the privilege afforded to farmers and merchants of offering grain in the open market, as undoubtedly it enables them to secure the market value, and gives a desirable indication of the true value of the various grains.

The Corn Sales Act of 1921 provides that all sales are to be effected by weight only, and expressed in terms of or by reference to the hundredweight of 112 lb. Experience has proved it to be convenient to quote at a price per 4½ cwt. for Wheat, 4 cwt. for Barley, and 3 cwt. for Oats.

The following statement gives a record of the year's proceedings in Edinburgh Corn Market.

1933.		WHEAT, per 4½ cwt.				BARLEY, per 4 cwt.				OATS, per 3 cwt.			
		Highest.		Lowest.		Highest.		Lowest.		Highest.		Lowest.	
		s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
January	4	26	6	26	0	29	0	20	0	16	9	15	6
"	11	27	0	26	6	29	0	20	6	17	0	15	6
"	18	27	0	26	6	29	0	20	6	17	0	16	0
"	25	27	6	26	6	28	0	20	0	17	0	16	0
February	1	26	6	26	0	27	0	22	0	16	6	15	6
"	8	26	0	25	0	24	0	20	0	16	0	15	0
"	15	25	6	24	6	24	6	20	0	15	6	14	6
"	22	24	6	24	0	24	0	18	0	15	3	14	6
March	1	24	6	24	0	24	0	18	0	15	3	14	3
"	8	24	6	24	0	24	6	21	0	15	0	14	0
"	15	25	0	24	6	25	0	22	0	15	0	14	3
"	22	25	6	25	0	26	0	22	0	15	6	14	6
"	29	25	6	..		26	0	22	0	16	0	15	0
April	5	26	0	25	6	26	6	23	0	16	6	15	3
"	12	26	6	26	0	30	0	23	0	16	3	15	3
"	19	26	6	26	0	31	0	22	0	15	9	15	0
"	26	26	6	26	0	27	0	22	0	15	6	14	6
May	3	27	0	26	6	31	0	23	0	15	6	14	9
"	10	26	6	26	0	31	6	23	0	15	9	15	0
"	17	26	6	26	3	31	0	23	0	16	3	15	3
"	24	26	6	26	0	31	0	23	0	16	3	15	3
"	31	26	6	26	0	32	0	23	0	16	3	15	6
June	7	27	0	26	6	31	0	24	0	16	0	15	0
"	14	27	0	26	6	31	0	24	0	15	6	14	9
"	21	27	0	26	6	31	0	24	0	15	6	14	6
"	28	28	6	28	0	31	0	22	0	15	3	14	6
July	5	30	0	29	0	31	0	23	0	15	3	14	6
"	12	32	0	31	0	32	0	24	0	16	0	15	0
"	19	32	0	31	0	32	0	24	0	16	9	15	6
"	26	32	0	31	0	34	0	32	0	17	0	16	0
August	2	31	6	31	0	..		..		16	6	15	6
"	9	31	0	25	0	..		..		16	0	..	
"	16	22	6	22	0	35	0	30	0	16	0	15	6
"	23	22	6	22	0	36	0	30	0	16	6	16	0
"	30	23	0	22	6	37	0	30	0	16	9	15	0
September	6	23	0	22	6	40	0	30	0	17	0	16	9
"	13	22	0	21	6	40	0	30	0	17	0	16	6
"	20	22	0	21	6	40	0	28	0	16	9	16	3
"	27	22	6	21	6	40	0	33	0	16	3	16	0
October	4	22	6	21	6	40	0	30	0	16	6	16	0
"	11	22	0	21	0	40	0	30	0	16	6	16	0
"	18	21	0	20	6	40	0	32	0	16	6	16	0
"	25	20	9	20	0	39	0	32	0	16	6	16	0
November	1	21	6	20	6	40	0	32	0	16	3	15	6
"	8	21	6	20	6	40	0	32	0	16	0	15	3
"	15	21	6	20	6	39	0	32	0	16	0	15	3
"	22	21	6	20	6	39	0	36	0	16	0	15	0
"	29	21	0	20	6	39	0	31	0	15	9	14	9
December	6	21	0	20	6	38	0	30	0	15	9	14	9
"	13	20	6	20	0	37	0	30	0	15	6	14	0
"	20	20	6	20	0	37	0	30	0	15	6	14	0
"	27	20	6	20	0	37	0	30	0	15	6	14	0

PRICES OF SHEEP SINCE 1818.

TABLE No. 1.—CHEVIOT SHEEP.

Year.	Wethers.					Ewes.					Lambs.				
	s.	*d.*		*s.*	*d.*	*s.*	*d.*		*s.*	*d.*	*s.*	*d.*		*s.*	*d.*
1818	28	0	to	30	0	not quoted.					8	0	to	10	0
1819	25	0	〃	27	0	15	0	to	17	0	10	6	〃	12	0
1820	20	0	〃	25	0	16	0	〃	17	0	10	0	〃	11	0
1821	18	0	〃	20	0	14	0	〃	16	0	7	6	〃	8	0
1822	12	6	〃	13	0	8	0	〃	8	6	4	6	〃	0	0
1823	13	6	〃	18	0	7	0	〃	10	6	5	6	〃	6	0
1824	14	0	〃	19	0	7	0	〃	9	0	4	6	〃	6	0
1825	29	0	〃	32	0	15	0	〃	19	0	9	0	〃	10	6
1826	17	6	〃	21	6	13	0	〃	15	0	7	0	〃	7	6
1827	15	0	〃	24	0	not quoted.					7	0	〃	8	0
1828	18	0	〃	27	6	12	0	to	15	0	7	0	〃	8	3
1829	18	0	〃	24	0	12	6	〃	14	0	7	0	〃	8	6
1830	15	0	〃	21	0	8	0	〃	11	0	6	0	〃	6	9
1831	18	0	〃	25	0	9	0	〃	13	0	7	0	〃	8	0
1832	19	0	〃	24	0	11	0	〃	16	0	7	0	〃	9	0
1833	22	0	〃	31	0	13	6	〃	20	0	8	0	〃	11	8
1834	22	0	〃	31	0	13	6	〃	21	0	9	0	〃	11	6
1835	22	0	〃	27	6	18	0	〃	20	6	8	0	〃	11	0
1836	24	0	〃	31	6	16	0	〃	19	0	10	0	〃	14	0
1837	19	0	〃	28	0	14	0	〃	19	0	10	0	〃	13	0
1838	23	0	〃	30	6	17	0	〃	22	0	12	0	〃	14	0
1839	23	0	〃	31	0	14	0	〃	19	0	0	0	〃	13	0
1840	24	0	〃	33	0	15	0	〃	28	0	7	0	〃	11	6
1841	23	0	〃	30	0	14	0	〃	22	0	8	0	〃	12	0
1842	22	6	〃	28	0	13	0	〃	17	0	7	6	〃	10	0
1843	19	0	〃	25	0	8	0	〃	12	0	5	0	〃	8	0
1844	21	0	〃	29	0	10	0	〃	16	0	8	0	〃	10	6
1845	23	0	〃	33	0	13	0	〃	20	0	8	0	〃	13	0
1846	24	0	〃	33	6	14	6	〃	21	6	10	0	〃	14	6
1847	24	0	〃	35	0	13	0	〃	24	0	11	6	〃	15	0
1848	23	0	〃	34	6	13	0	〃	28	0	11	6	〃	15	0
1849	21	0	〃	30	2	12	0	〃	21	0	0	0	〃	14	0
1850	20	6	〃	29	6	12	0	〃	20	0	8	0	〃	13	0
1851	21	6	〃	31	0	13	0	〃	21	0	8	9	〃	14	0
1852	21	0	〃	32	0	15	0	〃	23	0	8	0	〃	14	0
1853	26	6	〃	38	0	17	0	〃	28	6	9	0	〃	17	0
1854	25	0	〃	36	0	17	0	〃	26	0	9	0	〃	16	6
1855	23	6	〃	36	0	16	0	〃	25	0	10	0	〃	17	0
1856	22	0	〃	35	6	15	6	〃	24	0	10	0	〃	15	0
1857	24	0	〃	36	0	14	6	〃	26	0	10	6	〃	14	6
1858	24	0	〃	34	6	14	0	〃	24	6	10	6	〃	14	0
1859	25	0	〃	34	6	16	0	〃	25	0	10	8	〃	14	9
1860	26	0	〃	38	0	17	6	〃	27	6	12	6	〃	17	6
1861	25	0	〃	38	6	16	0	〃	28	0	9	0	〃	16	0
1862	27	0	〃	37	6	17	6	〃	28	0	10	0	〃	16	0
1863	25	0	〃	38	6	19	0	〃	28	6	10	6	〃	16	0
1864	31	0	〃	41	0	21	0	〃	31	6	14	0	〃	18	0
1865	32	6	〃	44	0	22	6	〃	33	6	14	6	〃	20	0
1866	37	0	〃	50	0	29	0	〃	42	6	15	0	〃	26	0
1867	26	0	〃	58	0	18	0	〃	25	6	12	0	〃	16	0
1868	30	0	〃	32	0	15	6	〃	21	0	7	6	〃	13	0
1869	28	0	〃	38	0	15	0	〃	22	6	7	6	〃	14	0
1870	35	6	〃	43	0	18	0	〃	28	0	10	0	〃	17	0
1871	36	6	〃	49	0	22	0	〃	33	6	14	0	〃	20	0
1872	45	0	〃	56	0	32	0	〃	42	0	16	0	〃	22	0
1873	42	0	〃	51	0	25	0	〃	42	0	15	6	〃	22	0
1874	33	6	〃	44	6	21	0	〃	36	0	12	0	〃	17	0

TABLE No. 1.—CHEVIOT SHEEP—*Continued.*

Year.	Wethers.					Ewes.					Lambs.				
	s.	*d.*		*s.*	*d.*	*s.*	*d.*		*s.*	*d.*	*s.*	*d.*		*s.*	*d.*
1875	33	0	to	48	6	21	0	to	34	0	13	6	to	28	6
1876	40	0	〃	52	6	28	0	〃	30	0	13	6	〃	25	0
1877	41	0	〃	51	0	25	0	〃	37	0	15	0	〃	24	0
1878	35	6	〃	48	0	23	6	〃	35	0	14	0	〃	22	0
1879	34	0	〃	44	0	21	0	〃	34	0	14	0	〃	20	0
1880	30	0	〃	43	6	20	0	〃	30	0	12	6	〃	20	0
1881	32	0	〃	45	6	29	0	〃	34	0	14	0	〃	20	0
1882	40	0	〃	51	0	30	0	〃	40	0	14	0	〃	20	6
1883	44	0	〃	55	6	34	6	〃	46	6	15	6	〃	23	0
1884	36	0	〃	47	6	29	6	〃	41	6	12	6	〃	20	0
1885	30	0	〃	38	0	24	0	〃	31	0	12	0	〃	18	0
1886	32	0	〃	40	0	21	0	〃	29	0	12	6	〃	19	0
1887	29	0	〃	36	0	18	0	〃	26	0	11	0	〃	16	6
1888	30	0	〃	38	0	19	0	〃	27	0	12	0	〃	17	6
1889	36	0	〃	44	0	24	0	〃	32	0	14	0	〃	22	0
1890	31	0	〃	40	0	22	0	〃	30	0	12	6	〃	20	0
1891	27	0	〃	38	0	16	0	〃	25	0	9	0	〃	16	0
1892	22	0	〃	30	6	13	0	〃	22	0	5	0	〃	11	0
1893	26	0	〃	35	6	18	0	〃	28	6	8	6	〃	15	0
1894	26	0	〃	37	0	20	0	〃	31	0	10	6	〃	18	6
1895	28	0	〃	39	0	22	0	〃	34	0	11	6	〃	19	6
1896	24	6	〃	34	0	19	0	〃	30	6	9	0	〃	16	6
1897	27	0	〃	36	0	21	0	〃	31	6	11	0	〃	17	6
1898	27	0	〃	37	0	22	0	〃	32	6	12	0	〃	18	6
1899	24	0	〃	33	0	20	0	〃	30	6	10	6	〃	16	0
1900	26	0	〃	36	0	22	0	〃	32	6	12	0	〃	17	0
1901	25	0	〃	32	6	20	0	〃	29	6	11	0	〃	16	0
1902	24	0	〃	31	6	18	0	〃	27	0	9	6	〃	14	6
1903	26	0	〃	34	0	21	0	〃	31	0	11	4	〃	18	0
1904	28	6	〃	36	6	23	0	〃	32	6	13	0	〃	20	0
1905	27	6	〃	35	0	23	0	〃	33	0	14	0	〃	21	0
1906	30	0	〃	38	0	26	0	〃	34	6	15	0	〃	23	0
1907	28	0	〃	34	0	22	0	〃	30	6	13	6	〃	19	6
1908	26	0	〃	32	6	21	0	〃	27	6	11	6	〃	17	0
1909	24	0	〃	31	0	18	0	〃	25	6	9	6	〃	16	0
1910	27	0	〃	35	0	22	0	〃	31	0	12	0	〃	20	0
1911	24	0	〃	31	6	18	6	〃	27	6	10	6	〃	18	0
1912	26	0	〃	34	6	22	0	〃	31	0	13	0	〃	21	0
1913	30	0	〃	39	0	24	0	〃	35	6	16	0	〃	24	0
1914	32	6	〃	41	0	28	0	〃	39	0	18	0	〃	27	6
1915	36	0	〃	46	0	31	0	〃	44	0	20	0	〃	30	6
1916	40	6	〃	51	0	34	0	〃	49	0	22	0	〃	34	6
1917	43	6	〃	56	0	38	0	〃	56	0	24	0	〃	34	0
1918	50	0	〃	66	0	42	0	〃	61	0	25	0	〃	37	0
1919	53	0	〃	69	0	44	6	〃	67	0	28	0	〃	40	6
1920	56	0	〃	91	0	48	0	〃	79	0	34	0	〃	49	0
1921	45	0	〃	60	0	52	3	〃	85	9	33	9	〃	52	3
1922	40	0	〃	56	0	56	0	〃	90	6	27	0	〃	50	0
1923	44	0	〃	65	0	61	0	〃	106	0	30	0	〃	62	0
1924	41	0	〃	61	0	60	0	〃	100	0	Ewe lambs—				
											40	0	to	85	6
											Wether lambs—				
											31	6	to	58	0
1925	39	3	〃	50	0	56	0	〃	88	9	Ewe lambs—				
											36	0	to	82	0
											Wether lambs—				
											22	3	to	50	6
1926	35	0	〃	49	3	34	6	〃	64	6	Ewe lambs—				
											28	6	to	66	6
											Wether lambs—				
											26	3	to	42	0
1927	28	9	〃	46	3	32	6	〃	55	6	Ewe lambs—				
											25	3	to	52	0
											Wether lambs—				
											23	3	to	39	0
1928	28	3	〃	48	6	30	6	〃	55	6	Ewe lambs—				
											28	0	to	45	0
											Wether lambs—				
											22	9	to	47	0
1929	33	6	〃	54	6	34	6	〃	62	0	Ewe lambs—				
											30	6	to	51	9
											Wether lambs—				
											25	6	to	47	0

TABLE No. 1.—CHEVIOT SHEEP—*Continued.*

Year.	Wethers.	Ewes.	Lambs.
	s. *d.* *s.* *d.*	*s.* *d.* *s.* *d.*	*s.* *d.* *s.* *d.*
1930	36 0 to 54 0	35 0 to 74 6	Ewe lambs— 30 0 to 59 0 Wether lambs— 24 0 to 47 3
1931	24 0 " 45 6	23 0 " 50 6	Ewe lambs— 21 0 to 57 6 Wether lambs— 17 0 to 37 0
1932	16 0 " 26 6	18 0 " 36 6	Ewe lambs— 12 0 to 33 0 Wether lambs— 10 6 to 24 6
1933	16 0 " 28 0	25 3 " 40 0	Ewe lambs— 19 6 to 33 0 Wether lambs— 16 6 to 31 6

TABLE NO. 2.—BLACKFACE SHEEP.

Year.	Wethers.					Ewes.					Lambs.				
	s.	*d.*		*s.*	*d.*	*s.*	*d.*		*s.*	*d.*	*s.*	*d.*		*s.*	*d.*
1819	22	0	to	24	0	12	0	to	15	0	8	0	to	9	0
1820	20	0	〃	23	3	15	6	〃	17	0	7	0	〃	8	6
1821	18	0	〃	20	0	12	0	〃	13	0	6	0	〃	7	0
1822	11	6	〃	13	6	5	6	〃	6	0	4	6	〃	0	0
1823	12	0	〃	16	0	5	0	〃	6	6	4	0	〃	5	3
1824	9	6	〃	13	6	6	0	〃	7	0	4	0	〃	5	0
1825	22	0	〃	26	0	11	0	〃	13	6	6	0	〃	9	0
1826	15	0	〃	17	0	8	0	〃	9	0	4	6	〃	6	0
1827	14	0	〃	18	6	7	0	〃	10	0	6	0	〃	7	6
1828	15	0	〃	20	0	8	0	〃	11	0	5	0	〃	7	6
1829	14	0	〃	18	0	9	0	〃	10	0	6	0	〃	7	0
1830	9	6	〃	13	0	4	0	〃	6	0	4	6	〃	6	0
1831	13	0	〃	17	0	5	0	〃	7	6	5	0	〃	6	6
1832	14	0	〃	18	0	7	0	〃	11	6	6	0	〃	7	8
1833	16	0	〃	24	0	7	6	〃	12	0	6	6	〃	9	0
1834	16	0	〃	22	0	10	0	〃	13	0	6	0	〃	8	6
1835	15	0	〃	18	9	10	0	〃	13	0	7	0	〃	8	0
1836	15	0	〃	21	0	9	0	〃	12	0	8	6	〃	11	0
1837	13	0	〃	16	0	8	0	〃	12	0	8	0	〃	9	6
1838	15	0	〃	20	6	10	0	〃	13	0	not quoted.				
1839	15	0	〃	22	0	10	0	〃	12	0	7	0	to	8	3
1840	15	0	〃	22	6	11	0	〃	12	0	7	0	〃	9	3
1841	16	0	〃	20	0	9	0	〃	11	0	6	0	〃	8	0
1842	14	0	〃	19	0	7	6	〃	8	0	5	6	〃	7	0
1843	not quoted.					4	9	〃	6	6	not quoted.				
1844	15	0	to	21	0	6	6	〃	10	0	5	0	to	8	0
1845	14	0	〃	23	0	8	0	〃	12	0	6	0	〃	8	0
1846	13	0	〃	24	0	10	0	〃	13	0	8	0	〃	9	0
1847	20	6	〃	25	0	10	0	〃	14	0	8	6	〃	9	6
1848	20	0	〃	24	0	11	3	〃	12	0	8	6	〃	10	0
1849	not quoted.					not quoted.					7	0	〃	7	6
1850			..					..			7	0	〃	0	0
1851	17	6	to	23	0	9	0	to	12	0	6	6	〃	8	0
1852	18	6	〃	22	0	9	6	〃	12	0	4	6	〃	7	9
1853	23	0	〃	27	0	14	6	〃	16	6	8	0	〃	11	6
1854	20	0	〃	26	0	11	0	〃	16	6	8	0	〃	10	6
1855	23	6	〃	26	6	14	0	〃	16	0	10	0	〃	11	6
1856	17	0	〃	24	0	10	0	〃	20	0	7	6	〃	10	0
1857	20	0	〃	29	0	10	6	〃	15	0	9	3	〃	11	0
1858	20	0	〃	27	6	9	9	〃	18	9	8	3	〃	10	6
1859	20	0	〃	25	0	10	0	〃	14	0	8	9	〃	11	0
1860	21	0	〃	27	3	11	0	〃	16	0	10	0	〃	13	6
1861	21	0	〃	29	0	12	0	〃	22	0	6	3	〃	14	0
1862	18	9	〃	27	0	12	0	〃	18	8	6	0	〃	12	0
1863	20	0	〃	30	6	13	0	〃	16	0	8	0	〃	11	6
1864	25	0	〃	30	0	15	0	〃	19	0	10	0	〃	13	6
1865	15	6	〃	32	6	15	0	〃	25	0	10	0	〃	17	0
1866	31	6	〃	40	0	20	0	〃	36	0	13	6	〃	22	6
1867	20	0	〃	30	6	14	0	〃	22	0	7	6	〃	13	6
1868	20	0	〃	26	0	10	6	〃	13	6	7	0	〃	13	0
1869	22	0	〃	28	0	11	0	〃	14	0	6	9	〃	9	0
1870	27	0	〃	32	6	13	0	〃	22	0	8	0	〃	14	6
1871	23	0	〃	37	0	13	0	〃	23	0	11	0	〃	16	3
1872	31	6	〃	45	0	18	0	〃	32	0	12	6	〃	18	0
1873	28	0	〃	39	0	16	6	〃	27	0	7	0	〃	16	0
1874	25	0	〃	35	0	13	0	〃	20	0	7	0	〃	14	0
1875	26	6	〃	37	6	15	0	〃	21	3	9	6	〃	17	6
1876	30	0	〃	40	0	19	0	〃	24	0	13	0	〃	20	6
1877	35	0	〃	38	9	18	0	〃	25	0	13	6	〃	23	0
1878	30	0	〃	36	0	17	0	〃	23	0	12	0	〃	22	0
1879	25	0	〃	35	9	16	0	〃	24	0	10	6	〃	20	0
1880	25	0	〃	38	0	16	6	〃	22	6	10	0	〃	17	0
1881	30	0	〃	39	0	15	0	〃	28	0	10	0	〃	15	0
1882	33	0	〃	46	0	20	0	〃	28	0	12	6	〃	18	6
1883	36	0	〃	50	6	24	6	〃	33	0	14	0	〃	21	6
1884	29	0	〃	43	6	19	6	〃	28	0	12	0	〃	19	6
1885	24	0	〃	34	0	18	0	〃	22	6	10	0	〃	15	0
1886	25	0	〃	34	0	12	0	〃	22	0	10	6	〃	16	0
1887	22	0	〃	30	0	11	0	〃	19	0	8	0	〃	13	0
1888	22	0	〃	32	0	13	0	〃	24	0	10	0	〃	15	0
1889	26	0	〃	40	0	18	0	〃	29	0	13	0	〃	22	0

TABLE No. 2.—BLACKFACE SHEEP—*Continued.*

Year.	Wethers.					Ewes.					Lambs.				
	s.	*d.*		*s.*	*d.*	*s.*	*d.*		*s.*	*d.*	*s.*	*d.*		*s.*	*d.*
1890	24	0	to	37	0	14	0	to	27	0	10	6	to	19	0
1891	21	0	"	37	0	10	0	"	24	0	7	6	"	15	0
1892	16	0	"	28	6	6	0	"	17	0	3	0	"	10	0
1893	21	0	"	37	0	12	0	"	24	0	7	0	"	14	0
1894	20	0	"	37	0	14	6	"	26	6	8	6	"	16	6
1895	23	0	"	41	0	16	0	"	28	6	9	0	"	17	0
1896	19	0	"	35	4	13	0	"	24	0	6	0	"	13	6
1897	21	0	"	36	6	15	0	"	25	6	7	0	"	14	6
1898	22	0	"	37	0	16	0	"	26	6	8	0	"	15	0
1899	20	0	"	33	6	13	0	"	24	0	5	6	"	13	0
1900	23	0	"	36	0	16	0	"	26	6	8	0	"	15	6
1901	20	0	"	35	0	14	0	"	25	6	6	6	"	14	6
1902	18	6	"	34	0	12	0	"	24	0	6	0	"	14	0
1903	21	0	"	36	0	15	0	"	28	0	7	0	"	16	6
1904	23	0	"	38	6	18	0	"	30	0	8	6	"	17	6
1905	21	6	"	37	0	19	0	"	31	0	9	0	"	18	6
1906	23	0	"	38	0	20	0	"	33	0	10	0	"	19	6
1907	21	0	"	33	6	17	0	"	28	0	8	6	"	17	6
1908	19	6	"	30	0	15	0	"	24	6	8	0	"	16	0
1909	17	0	"	28	0	11	6	"	22	0	6	3	"	13	0
1910	21	0	"	32	6	16	0	"	27	6	8	0	"	17	0
1911	19	0	"	29	6	14	0	"	24	0	7	0	"	15	0
1912	21	6	"	32	6	17	0	"	27	6	9	6	"	17	6
1913	24	6	"	36	0	21	0	"	31	0	12	6	"	21	6
1914	27	0	"	38	6	25	0	"	34	6	15	6	"	24	0
1915	31	0	"	42	6	29	0	"	39	6	17	0	"	25	6
1916	33	0	"	46	6	31	0	"	42	0	19	0	"	27	6
1917	36	0	"	51	0	33	0	"	47	0	21	0	"	30	0
1918	41	0	"	56	0	36	0	"	50	0	27	0	"	33	0
1919	44	0	"	62	0	39	0	"	54	0	29	0	"	36	0
1920	46	0	"	66	0	44	0	"	62	0	31	0	"	43	0
1921	32	9	"	60	9	35	3	"	62	6	20	3	"	47	0
1922	40	3	"	63	0	40	6	"	74	0	18	0	"	44	0
1923	46	0	"	65	6	43	0	"	78	0	21	6	"	45	6
1924	46	0	"	68	6	45	6	"	85	0	25	0	"	55	6
1925	36	0	"	60	0	40	0	"	78	0	17	6	"	44	0
1926	30	0	"	54	0	31	0	"	70	0	Wether lambs—				
											21	9	to	49	0
											Ewe lambs—				
											19	0	to	50	0
1927	26	6	"	48	0	26	0	"	64	0	Wether lambs—				
											17	9	to	40	0
											Ewe lambs—				
											17	6	to	37	9
1928	29	0	"	45	9	24	0	"	57	0	Wether lambs—				
											16	6	to	38	6
											Ewe lambs—				
											17	0	to	38	9
1929	29	9	"	46	0	29	0	"	64	0	Wether lambs—				
											20	9	to	43	0
											Ewe lambs—				
											18	0	to	37	6
1930	31	6	"	45	0	28	6	"	60	0	Wether lambs—				
											20	0	to	45	9
											Ewe lambs—				
											20	0	to	37	6
1931	19	6	"	29	9	15	0	"	38	0	Wether lambs—				
											14	3	to	36	9
											Ewe lambs—				
											16	6	to	40	6
1932	12	0	"	19	6	15	0	"	29	0	Wether lambs—				
											7	3	to	13	6
											Ewe lambs—				
											7	0	to	14	6
1933			..			20	0	"	34	0	Wether lambs—				
											12	9	to	19	3
											Ewe lambs—				
											11	0	to	18	3

TABLE No. 3.—PRICE OF WOOL, PER STONE OF 24 LB., SINCE 1818.

Year.	Laid Cheviot.	White Cheviot.	Laid Highland.	White Highland.
	s. d. *s. d.*	*s. d.* *s. d.*	*s. d.* *s. d.*	*s. d.* *s. d.*
1818	40 0 to 42 2	..	20 0 to 22 6	..
1819	21 0 „ 22 0	..	10 0 „ 10 3	..
1820	20 0 „ 22 0	..	9 0 „ 10 0	..
1821	18 0 „ 20 0	..	9 0 „ 10 0	..
1822	12 6 „ 14 6	..	5 0 „ 6 6	..
1823	9 0 „ 10 6	..	5 0 „ 5 9	..
1824	13 6 „ 15 0	..	6 0 „ 6 3	..
1825	10 6 „ 22 0	..	10 0 „ 10 6	..
1826	11 0 „ 14 0	..	5 0 „ 5 6	..
1827	11 0 „ 14 0	..	5 6 „ 6 9	..
1828	8 0 „ 11 0	..	5 6 „ 6 0	..
1829	8 6 „ 11 0	..	4 3 „ 0 0	..
1830	9 0 „ 11 0	..	4 6 „ 5 0	..
1831	17 0 „ 20 0	..	7 6 „ 8 6	..
1832	14 0 „ 16 0	..	7 0 „ 7 6	..
1833	18 0 „ 20 7	..	10 0 „ 11 0	..
1834	21 0 „ 24 6	..	5 6 „ 7 0	..
1835	19 0 „ 20 6	..	9 6 „ 10 8	..
1836	21 0 „ 25 0	..	10 0 „ 14 0	..
1837	12 0 „ 14 0	..	7 0 „ 7 8	..
1838	19 0 „ 22 6	..	6 0 „ 10 0	..
1839	18 0 „ 20 0	..	8 0 „ 12 0	..
1840	15 0 „ 0 0	..	7 0 „ 0 0	..
1841	15 0 „ 16 9	..	6 0 „ 7 5	..
1842	12 6 „ 14 0	..	not quoted.	..
1843	9 0 „ 11 6	..	5 0 to 6 0	..
1844	15 0 „ 18 0	..	not quoted.	.
1845	14 6 „ 17 6	..	7 6 to 8 6	..
1846	12 0 „ 14 6	..	8 0 „ 8 6	..
1847	12 6 „ 14 0	..	not quoted.	..
1848	9 6 „ 11 0	..	4 9 to 0 0	..
1849	12 0 „ 16 6	..	6 0 „ 6 3	..
1850	15 0 „ 17 6	..	5 0 „ 8 6	..
1851	12 0 „ 16 0	..	8 0 „ 9 3	..
1852	13 0 „ 15 0	..	8 0 „ 9 0	..
1853	19 0 „ 22 0	..	11 0 „ 12 6	..
1854	12 0 „ 15 0	..	7 6 „ 8 6	..
1855	14 6 „ 19 0	..	8 6 „ 9 0	..
1856	19 0 „ 21 6	..	11 0 „ 0 0	..
1857	19 0 „ 24 0	..	13 0 „ 14 3	..
1858	15 0 „ 17 0	..	8 9 „ 10 0	..
1859	18 6 „ 24 0	..	10 9 „ 11 6	..
1860	22 0 „ 32 0	37 0 to 38 0	10 0 „ 11 3	..
1861	19 6 „ 27 0	from 30s. upwards	not quoted.	..
1862	18 6 „ 26 0	30 0 to 37 0	11 6 to 16 0	..
1863	25 6 „ 31 0	38 0 „ 42 0	15 3 „ 17 6	..
1864	31 0 „ 39 0	47 0 „ 54 0	17 6 „ 20 0	..
1865	23 0 „ 30 0	44 0 „ 45 0	15 0 „ 17 0	..
1866	24 0 „ 30 0	30 0 „ 38 6	14 0 „ 16 0	..
1867	16 0 „ 21 6	not quoted	not quoted.	..
1868	19 0 „ 26 0	28 0 to 32 0	8 6 to 9 0	..
1869	18 0 „ 26 6	not quoted.	8 6 „ 10 0	..
1870	15 0 „ 23 6	25 0 to 26 0	9 6 „ 0 0	..
1871	20 0 „ 26 6	30 0 „ 34 6	12 0 „ 15 0	..
1872	26 0 „ 37 6	40 0 „ 48 0	18 0 „ 21 0	..
1873	17 0 „ 18 0	34 0 „ 40 0	9 0 „ 12 0	..
1874	18 6 „ 26 6	30 0 „ 34 0	9 6 „ 13 0	..
1875	25 0 „ 32 0	34 6 „ 36 0	12 6 „ 16 0	..
1876	20 0 „ 24 0	30 0 „ 34 6	9 6 „ 12 0	..
1877	20 9 „ 26 0	28 0 „ 30 0	10 0 „ 12 0	..
1878	18 9 „ 25 0	27 0 „ 32 0	8 6 „ 11 6	..
1879	15 0 „ 17 0	prices very low.	7 0 „ 0 0	..
1880	20 0 „ 24 0	30 0 to 32 0	10 6 „ 11 6	14 0 to 15 0
1881	17 0 „ 21 0	27 0 „ 30 0	5 0 „ 9 6	12 0 „ 13 0
1882	14 0 „ 18 0	27 6 „ 28 0	7 6 „ 9 0	13 0 „ 14 0
1883	13 0 „ 18 0	26 0 „ 28 0	6 6 „ 8 6	11 6 „ 12 6
1884	13 0 „ 18 0	26 0 „ 28 0	6 6 „ 8 6	11 6 „ 12 6
1885	12 0 „ 17 0	22 6 „ 26 0	6 0 „ 8 0	11 6 „ 12 0
1886	13 0 „ 18 0	23 0 „ 27 6	6 6 „ 8 6	11 6 „ 12 0
1887	14 0 „ 22 0	23 0 „ 28 0	7 0 „ 9 0	11 6 „ 13 0
1888	13 0 „ 20 0	23 0 „ 28 0	7 0 „ 9 0	11 0 „ 12 6

TABLE NO. 3.—PRICE OF WOOL—*Continued.*

Year.	Laid Cheviot.					White Cheviot.					Laid Highland.					White Highland.				
	s.	*d.*		*s.*	*d.*	*s.*	*d.*		*s.*	*d.*	*s.*	*d.*		*s.*	*d.*	*s.*	*d.*		*s.*	*d.*
1889	13	0	to	18	0	24	0	to	28	0	7	0	to	9	0	11	0	to	12	6
1890	13	0	"	18	0	24	0	"	28	0	7	0	"	9	0	11	0	"	12	6
1891	12	6	"	18	0	22	0	"	28	0	7	0	"	9	0	11	0	"	12	6
1892	12	0	"	18	0	20	0	"	28	0	7	0	"	8	6	10	6	"	12	0
1893	12	0	"	17	0	20	0	"	27	0	7	0	"	8	0	10	0	"	12	0
1894	12	0	"	16	0	20	0	"	26	0	7	0	"	8	0	10	0	"	12	0
1895	12	0	"	16	0	20	0	"	25	0	7	0	"	8	0	10	0	"	11	6
1896	11	0	"	15	0	19	0	"	24	0	7	0	"	8	0	10	0	"	11	6
1897	11	0	"	14	0	18	0	"	23	0	7	0	"	8	0	10	6	"	12	0
1898	10	0	"	13	0	16	0	"	20	0	7	0	"	8	0	10	0	"	11	6
1899	10	0	"	13	0	13	0	"	18	6	7	0	"	8	0	8	6	"	9	6
1900	9	9	"	12	0	13	0	"	18	6	6	9	"	7	9	8	0	"	9	6
1901	9	0	"	10	0	11	0	"	16	6	5	9	"	6	6	8	0	"	9	0
1902	9	0	"	10	0	11	6	"	17	0	6	0	"	6	6	8	6	"	9	6
1903	10	0	"	12	0	15	0	"	18	0	7	0	"	8	0	11	6	"	12	6
1904	15	0	"	17	0	20	0	"	21	0	9	0	"	10	0	14	0	"	15	0
1905	17	0	"	20	0	24	0	"	26	0	10	0	"	11	0	15	0	"	16	0
1906	18	0	"	21	0	27	0	"	28	6	11	6	"	13	0	16	6	"	17	6
1907			*			22	0	"	24	0	11	0	"	12	6	16	0	"	17	0
1908			*			16	0	"	18	0			†			8	0	"	8	6
1909			*			24	0	"	26	0			†			12	6	"	14	0
1910			*			25	0	"	30	0			†			13	0	"	14	6
1911			*			25	0	"	30	0			†			13	0	"	14	6
1912			*			24	0	"	29	0			†			14	0	"	15	0
1913			*			25	0	"	30	0			†			17	0	"	18	0
1914			*			24	0	"	29	0			†			15	0	"	15	6
1915‡			*			42	0	"	46	0			†			21	0	"	22	0

* No Cheviots smeared now. † No Highlands smeared now. ‡ These are July prices.

PRICE OF WOOL PER STONE OF 24 LB.—*Continued.*

		CHEVIOT.				HALF-BRED.				BLACK-FACE.		CROSS-BRED (BLACKFACE EWE AND LEICESTER RAM).			
		Hogg.		Ewe and Wether.		Hogg.		Ewe and Wether.		Hogg.	Ewe and Wether.	Hogg.		Ewe and Wether.	
		Washed.	Un-washed.	Washed.	Un-washed.	Washed.	Un-washed.	Washed.	Un-washed.			Washed.	Un-washed.	Washed.	Un-washed.
		s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
[1] 1916	. . .	36 6	30 0	33 0	27 6	34 6	28 6	33 0	27 6	23 0	23 0	28 6	25 6	28 6	25 6
	Caithness & Sutherland	40 0	32 6	34 0	29 0	35 0	29 0	34 0	28 6						
[1] 1917	. . .	40 6	33 0	37 0	31 0	38 6	31 6	37 0	31 0	25 6	25 6	31 6	28 6	31 6	28 6
	Caithness & Sutherland	44 6	36 0	37 6	32 6	39 0	32 6	37 6	31 6						
[1] 1918	. . .	43 6	35 6	39 6	33 0	41 0	33 6	39 6	33 0	27 0	27 0	33 6	30 6	33 6	30 6
	Caithness & Sutherland	47 6	38 6	40 0	34 6	41 6	34 6	40 0	33 6						
1919	. . .	84 0	70 0	82 0	66 0	82 0	62 0	70 0	58 0	34 0	34 0	46 0	39 0	44 0	58 0
	Caithness & Sutherland	88 0	74 0	84 0	68 0	84 0	63 0	72 0	60 0						
1920	. . .	86 0	70 0	83 0	66 0	74 0	54 0	65 0	50 0	24 0	24 0	35 0	29 0	34 0	27 0
	Caithness & Sutherland	90 0	74 0	87 0	68 0	76 0	56 0	68 0	52 0						
1921	. . .	22 0	17 0	19 0	15 0	18 6	14 6	16 0	13 0	9 6	9 6	12 0	10 0	12 0	10 0
	Caithness & Sutherland	23 0	18 0	20 0	16 0	19 6	15 6	17 0	14 0						
1922	. . .	30 0	25 0	26 0	22 0	26 0	20 0	22 0	18 0	16 0	16 0	16 6	15 0	16 6	15 0
	Caithness & Sutherland	31 6	26 0	27 0	23 0	27 0	21 0	23 0	19 0						
1923	. . .	41 0	34 0	36 0	30 0	33 0	27 0	30 0	25 0	17 6	17 6	20 0	18 0	20 0	18 0
	Caithness & Sutherland	43 0	35 0	37 0	31 0	34 0	28 0	31 0	26 0						
1924	. . .	58 0	49 0	53 0	45 0	49 0	40 0	45 0	39 0	25 6	25 6	34 6	30 6	33 0	30 0
	Caithness & Sutherland	60 0	50 0	54 0	46 0	50 0	41 0	46 0	40 0						
1925	. . .	39 0	34 0	36 0	30 0	33 6	28 6	32 0	27 0	25 6	25 6	26 0	23 6	25 6	23 0
	Caithness & Sutherland	40 0	35 0	37 0	31 0	34 0	29 0	33 0	28 0						
1926	. . .	35 0	29 0	32 0	28 0	32 0	26 6	28 0	24 6	19 0	19 0	22 6	20 0	22 0	19 6
	Caithness & Sutherland	36 0	30 0	33 0	29 0	33 0	27 6	29 0	25 6						
1927	. . .	38 0	31 0	35 0	31 0	34 6	29 6	32 0	27 6	24 0	24 0	27 0	25 6	27 0	25 0
	Caithness & Sutherland	39 0	32 0	36 0	32 0	35 0	30 0	33 0	28 6						
1928	. . .	51 0	43 0	48 0	41 0	47 0	40 0	43 0	37 0	24 6	24 6	33 0	31 0	32 0	30 0
	Caithness & Sutherland	52 0	44 0	49 0	42 0	48 0	41 0	44 0	38 0						
1929	. . .	37 0	32 0	34 0	29 0	34 0	29 0	32 0	27 0	24 0	24 0	27 0	25 0	26 0	24 0
1930	. . .	23 0	19 0	22 0	18 0	21 0	17 6	20 0	16 6	12 0	12 0	17 6	15 6	16 6	15 6
1931	. . .	16 6	13 6	15 6	13 0	15 0	13 0	13 6	11 6	11 0	11 0	12 0	10 6	11 6	10 0
1932	. . .	14 6	11 6	14 0	11 6	12 6	11 6	11 6	9 6	8 0	8 0	9 0	8 6	8 0	7 6
1933	. . .	20 0	17 0	19 0	16 0	18 0	16 0	17 0	14 0	11 6	11 6	12 0	11 0	11 6	11 0

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[1] The prices given were prices fixed by Government, and not free market prices.

GENERAL SHOW AT DUNDEE, 1933

The Society's One hundred and second Show was held at Dundee on Tuesday, 20th June, and three following days. It was the third Show to be held at Dundee, previous Shows at that centre having been held in the years 1843 and 1890.

An excellent site was provided for the Show by the Corporation of Dundee at Esplanade Park, which occupies a commanding position immediately to the west of the Tay Bridge, and between the rising ground to the north and the River Tay on the south. Although the extent of ground available was only about forty-one acres, it was absolutely level, so that every portion could be utilised. It was convenient of access from the city, and ample space was available on adjoining ground for the parking of cars. Over the greater part of the surface there was a good growth of grass, which was systematically mown by the Parks Department, and so presented an attractive appearance.

Besides providing the site and a free supply of water, the Corporation of Dundee generously contributed a handsome donation of £1000 to the Show Funds, and the Lord Provost, Members of Council and Officials were most enthusiastic in their endeavours to promote, in every way, the success of the Show.

The citizens of Dundee, to commemorate the holding of the Show in their city, subscribed for and presented to the Society two handsome Silver Challenge Cups, to be competed for annually at the Show. The Angus Agricultural Association also presented a valuable Silver Challenge Cup to the Society.

The entry of Live-stock was, in most sections, well above the average, and the high standard of recent Shows was fully maintained. The space occupied by Implement and Miscellaneous Exhibits was also greater than usual, and these exhibits provided both interest and instruction for the many visitors.

The weather experienced during the Show, and for weeks before, was extremely favourable, and the attendance of the public proved to be a record. The total number of visitors who paid for admission during the four days was 96,340. This compared with 86,793 at Edinburgh in 1919, which was the previous highest attendance. The Accounts of the Show show a profit of £4815, which also constituted a record, the previous highest profit being £4226 at Glasgow in 1925.

Their Royal Highnesses The Duke and Duchess of York honoured the Society by visiting the Show on the Thursday and Friday. They took the greatest interest in everything they saw, and were everywhere welcomed in a manner which provided conclusive evidence of their great popularity. H.R.H. The Duke of York, as President of the Society, presided over the Meeting of Members in the Showyard on the Thursday. Lunch was taken in the Royal Pavilion on both days, and Their Royal Highnesses carried out an extensive programme of visits to various exhibits. Their Royal Highnesses also viewed the Parades of animals from the Royal Box in the Grand Stand, and handed over the President's Champion Medals to the successful Exhibitors.

The following letter was received, after the Show, from Rear-Admiral Sir Basil V. Brooke:—

11 GROSVENOR CRESCENT, S.W.1.
June 27th 1933.

DEAR MR STIRTON,

Their Royal Highnesses the Duke and Duchess of York desire me to write and convey to you, and through you to all others connected with the Highland and Agricultural Society of Scotland's Show at Dundee, their appreciation of everything they did and saw at the Show last week. They were delighted that it was such a tremendous success this year and that all previous records for attendance were exceeded. Their Royal Highnesses fully realise that it entailed many months of hard work and efficient organisation to attain such very gratifying results.

The Duke and Duchess thought the arrangements for their visit were excellent in every way, and they were able to see the maximum number of stalls and exhibits in the time at their disposal with a minimum of fatigue.

Their Royal Highnesses both send their best wishes for the continued success of the Highland and Agricultural Society of Scotland under your able Secretaryship.

Believe me,

Yours very truly,

B. V. BROOKE,
Comptroller.

JOHN STIRTON, Esq.,
8 EGLINTON CRESCENT,
EDINBURGH.

STATISTICS.

The following tables give the number of entries in the various sections:—

CATTLE.

	SHORTHORN.	No. of Entries.
1.	Aged bulls	5
2.	Two-year-old bulls	2
3.	Two-year-old bulls	6
4.	One-year-old bulls	7
5.	One-year-old bulls	15
6.	Cows born before 1st December 1929, in milk	3
7.	Three-year-old cows	2
8.	Two-year-old cows or heifers	6
9.	One-year-old heifers	9
10.	One-year-old heifers	3
		58

ABERDEEN-ANGUS.

11.	Aged bulls	17	
12.	Two-year-old bulls	9	
13.	One-year-old bulls	10	
14.	One-year-old bulls	13	
15.	Cows born before 1st December 1929, in milk	6	
	Extra Stock	1	
16.	Three-year-old cows, in milk	7	
17.	Two-year-old cows or heifers	19	
18.	One-year-old heifers	22	
19.	One-year-old heifers	9	
		—	113

GALLOWAY.

20.	Aged bulls	5	
21.	Two-year-old bulls	1	
22.	One-year-old bulls	6	
23.	Cows born before 1st December 1930, in milk	10	
24.	Two-year-old cows or heifers	13	
25.	One-year-old heifers	16	
		—	51

BELTED GALLOWAY.

26.	Bulls born before 1st December 1931	4	
	Extra Stock	1	
27.	Bulls born on or after 1st December 1931	4	
28.	Cows or heifers, born before 1st December 1930, in milk or in calf; if in calf and not in milk, to calve on or before 1st December of the year of the Show	5	
29.	Heifers born on or after 1st December 1930 and before 1st December 1931	3	
30.	Heifers born on or after 1st December 1931	4	
		—	21

HIGHLAND.

31.	Aged bulls	3	
32.	Two-year-old bulls	4	
33.	One-year-old bulls	9	
34.	Cows of any age, with calf at foot	6	
35.	Three-year-old heifers	8	
36.	Two-year-old heifers	8	
37.	One-year-old heifers	9	
		—	47

AYRSHIRE.

38.	Cows in milk, born before 1930	12	
	Extra Stock	1	
39.	Cows in milk, born on or after 1st January 1930	9	
40.	Cows of any age, in calf, and due to calve before 1st December of the year of the Show	7	
41.	Heifers born on or after 1st June 1930, in calf, and due to calve before 1st December of the year of the Show	15	
42	Heifers born in 1931	4	
43.	Heifers born in 1932	9	
44.	Bulls born before 1931	4	
45.	Bulls born in 1931	4	
46.	Bulls born in 1932	5	
		—	70

British Friesian.

47. Cows in milk, born in or before 1929	6	
48. Cows in calf and not in milk, born in or before 1929	7	
49. Cows in milk, born in 1930 or 1931	4	
50. Heifers born in 1931	10	
51. Heifers born in 1932, before 1st July	10	
52. Heifers born in 1932, on or after 1st July	6	
53. Bulls born in or before 1930	5	
Extra Stock	1	
54. Bulls born in 1931	1	
55. Bulls born in 1932	9	
	—	5

Red Poll.

56. Cows in milk or in calf, born before 1931	(Cancelled—Regulation 12)
57. Heifers born in 1931	
58. Heifers born in 1932	
59. Bulls born in or before 1931	
60. Bulls born in 1932	

Fat Cattle.

61. Bullock, any pure breed or cross, born on or after 1st December 1930 and before 1st December 1931	6	
62. Bullock, any pure breed or cross, born on or after 1st December 1931	11	
63. Heifer, any pure breed or cross, and of any age	6	
	—	23

Dairy Cow.

64. Dairy cow, in milk, any pure breed or cross, and of any age (cancelled—Regulation 12)	...	
65. Dairy cow, in milk, drawn from Classes 28, 38, 39, 47, 49, 56 and 64 (Edinburgh Gold Cup) (6 entries)	...	
(For Exhibition Only)		
Dexter Cow	1	
	—	1
		443

HORSES.

Clydesdale Stallions and Colts.

66. Aged stallions	6	
67. Three-year-old entire colts	7	
68. Two-year-old entire colts	14	
69. One-year-old entire colts	14	
	—	41

Clydesdale Geldings.

70. Aged geldings	5	
71. Three-year-old geldings	9	
72. Two-year-old geldings	7	
73. One-year-old geldings	6	
	—	27

CLYDESDALE MARES AND FILLIES.

74.	Mares of any age, with foal at foot, or due to foal before 31st July 1933	8	
75.	Yeld mares, born before 1930	5	
76.	Three-year-old yeld mares or fillies	8	
77.	Two-year-old fillies	8	
78.	One-year-old fillies	14	
		—	43

SHIRE.

79.	Gelding, born before 1931 (cancelled—Regulation 12)	...	

SUFFOLK.

80.	Gelding, born before 1931	—	6

HUNTERS.

81.	Hunter brood mares, with foal at foot, or due to foal before 31st July 1933	2	
82.	Yeld mares, fillies, or geldings, born in 1930, in hand	11	
83.	Yeld mares, fillies, or geldings, born in 1931, in hand	7	
84.	Fillies, colts, or geldings, born in 1932, in hand	13	
85.	Mare or gelding, born before 1929, to carry 13 stone and over, in saddle	9	
86.	Mare or gelding, born in 1929, to carry 12 stone 7 lb. and over, in saddle	8	
		—	50

HIGHLAND PONIES AND WESTERN ISLAND PONIES.

87.	Stallion, born before 1931, not exceeding 14·2 hands	3	
	Extra Stock	1	
88.	Entire colt, born on or after 1st January 1931, not exceeding 14·2 hands	4	
89.	Mare, any age, not exceeding 14·2 hands, with foal at foot, or due to foal before 31st July 1933	..	
90.	Yeld Mare, born before 1931, not exceeding 14·2 hands	12	
	Extra Stock	1	
91.	Filly, born on or after 1st January 1931, not exceeding 14·2 hands	4	
92.	Gelding, born before 1931, not exceeding 14·2 hands	1	
		—	26

SHETLAND PONIES.

93.	Stallions, not exceeding 10½ hands, born before 1930	4	
	Extra Stock	2	
94.	Entire colts, not exceeding 10½ hands, born in 1930 or 1931	5	
95.	Mares, not exceeding 10½ hands, with foal at foot, or due to foal before 31st July 1933	6	
96.	Yeld mares, not exceeding 10½ hands	7	
97.	Fillies not exceeding 10½ hands, born in 1930 or 1931	6	
		—	30

SADDLE CLASSES.

98.	Mares or geldings, any age, over 13·2 hands and not exceeding 15 hands, in saddle	6	
99.	Mares or geldings, any age, not exceeding 13·2 hands, in saddle	4	
		—	10

HORSES IN HARNESS.

100.	Yeld mare, filly, or gelding, any age, in harness, exceeding 15 hands, to be driven in the ring	3	
101.	Yeld mare, filly, or gelding, any age, in harness, over 14 hands and not exceeding 15 hands, to be driven in the ring	4	
102.	Yeld mare, filly, or gelding, any age, in harness, not exceeding 14 hands, to be driven in the ring	7	
		—	14

DRAUGHT GELDINGS IN HARNESS.

103.	Draught gelding in cart harness (to be shown without vehicle)		9
			256

JUMPING.

1.	Horses or ponies, any height	20	
2.	Horses or ponies, any height—Confined to competitors permanently resident in Scotland	12	
3.	Horses or ponies, any height—handicap	20	
4.	Horses or ponies, any height	20	
5.	Horses or ponies, any height—handicap	18	
		—	90

SHEEP.

BLACKFACE.

104.	Tups, three shear and over	7	
105.	Tups, two shear	11	
106.	Shearling tups	32	
107.	Tup lambs	16	
108.	Ewes above one shear (born before 1932), unclipped, with lamb at foot	12	
109.	Shearling ewes or gimmers	19	
		—	97

CHEVIOT.

110.	Tups above one shear		
	Extra Stock	1	
111.	Shearling tups	13	
112.	Tup lambs	8	
113.	Ewes above one shear, with lamb at foot	5	
114.	Shearling ewes or gimmers	10	
115.	Ewe lambs	7	
		—	51

BORDER LEICESTER.

116.	Tups above one shear	7	
117.	Shearling tups	22	
118.	Tup lambs	26	
119.	Ewes above one shear	14	
120.	Shearling ewes or gimmers	24	
121.	Ewe lambs	17	
		—	110

Half-bred.

122.	Shearling tups	3	
123.	Ewes above one shear	5	
124.	Shearling ewes or gimmers	6	
125.	Ewe lambs	4	
		—	18

Oxford Down.

126.	Shearling tups	8	
127.	Shearling ewes or gimmers	12	
128.	Tup lambs	11	
129.	Ewe lambs	8	
		—	39

Suffolk.

130.	Tups, one shear and over	10	
131.	Shearling ewes or gimmers	13	
132.	Tup lambs	20	
133.	Ewe lambs	15	
		—	58

Shropshire.

134.	Tups, any age	For Exhibition only	3	
135.	Ewes or gimmers		3	
			—	6

Dorset Horn.

136.	Tups, any age	4	
137.	Ewes or gimmers	5	
	Extra Stock	2	
		—	11

Fat Sheep.

138.	Three fat lambs, any breed or cross, dropped in the year of the Show	6
		396

GOATS.

139.	Female goats, Toggenburg, British Toggenburg, or British Alpine, in milk	2	
140.	Female goats, Saanen, or British Saanen, in milk	2	
141.	Female goats, any other variety, in milk	3	
142.	Goatlings, Toggenburg, British Toggenburg, or British Alpine, over one but not exceeding two years	3	
143.	Goatlings, any other variety, over one but not exceeding two years	...	
144.	Female kids, any variety, not exceeding one year	7	
145.	Male kids, any variety, not exceeding one year	5	
		—	22

Milking Competitions.

146.	For quality, open to Classes 139 to 141 (6 entries)	...	
147.	For quantity, open to Classes 139 to 141 (6 entries)	...	
		—	...
			22

PIGS.

LARGE WHITE.

148.	Boars born before 1932	5	
149.	Boars born in 1932 before 1st July	4	
150.	Boars born in 1932 on or after 1st July	4	
151.	Boars born in 1933	8	
152.	Sows born before 1932	6	
153.	Sows born in 1932 before 1st July	8	
154.	Sows born in 1932 on or after 1st July	7	
155.	Sows born in 1932	11	
			53

LARGE BLACK.

156.	Boars born before 1933	5	
157.	Boars born in 1933	3	
158.	Sows born before 1932	5	
159.	Sows born in 1932	6	
160.	Sows born in 1933	3	
			22
			75

POULTRY.

1-130.	491

EGGS.

1-4.	44

FUR-PRODUCING RABBITS.

1-19.	89

HONEY, &c.

OPEN CLASSES.

1.	Collection of appliances suitable for a beginner's outfit for bee-keeping	1	
2.	Best and most complete frame hive for general use, with any improvements. Unpainted	6	
3.	Best and most complete hive. Unpainted. Price not to exceed 35s.	3	
4.	Six sections of comb honey, excluding heather honey	7	
5.	Six sections of heather honey	4	
6.	Six jars of run or extracted light-coloured honey, approximate weight 6 lb.	7	
7.	Six jars of run or extracted medium or dark-coloured honey, excluding heather honey, approximate weight 6 lb.	5	
8.	Six jars of pressed heather honey in liquid form, approximate weight 6 lb.	8	
9.	Six jars of granulated honey, approximate weight 6 lb.	10	
10.	Two shallow frames of comb honey for extracting purposes	7	
11.	Best display of honey in any form suitable for a shop window in space 4 feet by 4 feet; weight of honey not to exceed 40 lb.	2	
12.	Best exhibit of not less than 1 lb. of wax in any form	8	
13.	Best exhibit of not less than 1 lb. of wax made into shapes for retail trade and over-counter trade	6	
14.	Observatory hive with queen and bees—two or more frames	5	
15.	Observatory hive with queen and bees—one frame, no super	6	
			85

CONFINED TO SCOTTISH EXHIBITORS.

16. One standard frame of comb honey for extracting purposes	2	
17. Six sections of comb honey, excluding heather honey	9	
18. Six sections of heather honey	10	
19. Six jars of run or extracted medium or dark-coloured honey, excluding heather honey, approximate weight 6 lb.	7	
20. Six jars of pressed heather honey in liquid form, approximate weight 6 lb.	9	
21. Six jars of run or extracted light-coloured honey, approximate weight 6 lb.	9	
22. Mead, made from honey	2	
		48
		133

DAIRY PRODUCE.

1. Powdered butter, not less than 3 lb.	13	
2. Fresh butter, three 1-lb. lots	17	
3. Cheddar cheese, 56 lb. and upwards	7	
4. Cheese, 14 lb. and under	7	
		44

RURAL INDUSTRIES.

1-25	442

HORSE-SHOEING.

Class 1 (open), 59; class 2 (juniors), 17	76

SHOE-MAKING.

1 Class (open)	55

LIVE STOCK JUDGING.

Open to persons not exceeding 23 years of age	100

BUTTERMAKING.

Class 1 (open), 56; class 2 (novice), 51	107

SUMMARY.

1. Cattle	443
2. Horses	256
3. Jumping	90
4. Sheep	396
5. Goats	22
6. Pigs	75
7. Poultry	491
8. Eggs	44
9. Fur-Producing Rabbits	89
10. Honey, &c.	133
11. Dairy Produce	44
12. Rural Industries	442
13. Horse-Shoeing	76
14. Shoe-Making	55
15. Live Stock Judging	100
16. Buttermaking	107
	2863

The following table gives a comparative view of the entry of cattle, horses, sheep, goats, pigs, poultry, eggs, rabbits, honey, dairy produce, wool, rural industries, &c., and implements, of the value of the premiums offered, and of the receipts at the entrance-gates, grand stands, and for catalogues at the Shows which have been held in Perth Show Division.

Year.	Cattle.	Horses.	Sheep.	Goats.	Pigs.	Poultry.	Eggs.	Rabbits.	Honey, &c.	Dairy Produce.	Wool.	Rural Industries.	Horse-Shoeing.	Live Stock Judging.	Butter-making.	Imple-ments.	Premiums.	Drawings at Show.
1829	192	53	78	..	13	..	..	..	..	..	..	..	..	..	..	14	£357	£119
1836	265	46	156	..	16	..	..	..	..	6	..	..	..	..	..	17	479	225
1843	317	73	129	..	21	17	..	..	..	31	..	..	..	..	..	101	990	900
1852	313	135	250	..	42	93	..	..	..	123	..	..	..	..	..	339	900	926
1861	335	155	271	..	52	120	..	..	..	91	..	..	..	..	..	850	1500	1,328
1871	376	177	300	..	43	225	..	..	..	38	.	..	..	..	..	1948	1600	2,270
1879	383	253	220	..	40	157	..	..	..	49	11	..	..	..	..	2207	2629	3,063
1887	..	230	311	..	26	210	..	..	..	72	..	..	..	..	..	1509	2372	1,841
1896	292	258	204	..	20	374	..	..	..	45	..	..	13	..	..	1945	2205	4,788
1904	348	315	283	..	35	413	..	..	..	46	..	..	..	..	..	1972	3058	4,993
1912	294	348	255	..	81	548	..	..	..	58	..	..	43	..	..	1801	3310	3,580
1924	406	283	366	21	202	760	..	..	175	59	65	422	68	..	..	2382	5712	10,758
1933	443	256	396	22	75	491	44	80	133	44	..	442	131	100	107	2471	6979	12,698

A COMPARISON.

The following figures relating to some of the most successful Shows the Society has held will be perused with interest:—

	Cattle.	Horses.	Sheep.	Goats.	Pigs.	Poultry.	Rabbits.	Total Live Stock.	Imple-ments.	Premiums.	Drawings at Show.	Profit.
Glasgow, 1867 .	286	212	257	..	58	150	..	963	1844	£1600	£3,005	£1307
Edinburgh, 1869	310	212	340	..	22	239	..	1123	1900	1600	4,078	2067
Glasgow, 1875 .	411	405	296	..	48	479	..	1639	2220	2665	6,231	3816
Edinburgh, 1877	339	342	305	..	30	234	..	1250	2292	2714	6,734	3710
Edinburgh, 1884	580	453	493	..	35	253	..	1814	2282	4348	6,548	1855
Edinburgh, 1893	380	349	294	..	31	360	..	1414	2268	2600	4,918	2323
Aberdeen, 1894 .	314	324	184	..	34	365	..	1221	2532	2440	5,121	1678
Perth, 1896 .	292	258	204	..	20	374	..	1148	1945	2205	4,788	2511
Glasgow, 1897 .	317	350	245	..	30	275	..	1217	2227	2897	4,392	2021
Edinburgh, 1899	386	518	477	..	46	551	..	1978	2585	3844	10,285	3911
Stirling, 1900 .	321	288	369	..	28	457	..	1463	2095	2915	4,305	1078
Inverness, 1901 .	360	257	204	..	22	499	..	1340	1460	2806	2,485	99
Aberdeen, 1902 .	330	253	243	..	42	475	..	1343	1988	2796	4,418	1604
Perth, 1904 .	348	315	283	..	35	413	..	1394	1972	3058	4,993	1828
Glasgow, 1905 .	310	462	284	..	60	534	..	1750	1875	3702	4,473	1208
Peebles, 1906 .	258	258	291	..	40	438	..	1280	1658	3072	2,596	416
Edinburgh, 1907	363	464	352	..	58	605	..	1842	2140	3614	7,061	2309
Aberdeen, 1908 .	331	299	237	..	42	509	..	1418	1931	3045	4,596	1881
Stirling, 1909 .	330	355	249	..	54	539	..	1527	1977	3017	4,638	1100
Dumfries, 1910 .	270	355	295	..	54	481	..	1455	1950	3057	3,411	562
Paisley, 1913 .	408	472	334	..	48	536	..	1798	1968	5109	6,468	-2527
Edinburgh, 1919	215	301	221	60	43	398	..	1238	1605	4517	17,377	3275
Aberdeen, 1920 .	340	250	279	19	112	597	..	1597	2065	4608	14,120	1679
Stirling, 1921 .	367	279	299	59	188	582	..	1774	2201	5055	12,822	2850
Dumfries, 1922 .	422	272	339	41	229	588	..	1891	2156	5488	11,428	1090
Perth, 1924 .	406	283	366	21	202	760	..	2038	2382	5712	10,758	2811
Glasgow, 1925 .	461	340	349	31	178	577	178	2114	2570	6136	12,865	4226
Kelso, 1926 .	430	284	597	31	159	546	108	2155	2866	6004	9,218	324
Edinburgh, 1927	462	357	498	63	201	724	184	2484	2874	6049	12,315	2090
Aberdeen, 1928 .	421	277	349	25	80	578	120	1850	2377	6131	11,081	1882
Edinburgh, 1931	635	389	684	47	117	644	125	2641	2991	9608	12,478	704
Dundee, 1933 .	443	256	396	22	75	491	89	1772	2471	6979	12,698	4813

CATTLE.

The entry of Cattle was well up to the average, the numbers in the various sections reaching a total of 443, a few more than at the Perth Show in 1924, and an increase of practically 100 over the entry for Inverness Show of 1932.

To commemorate the Presidency of H.R.H. The Duke of York, the Society offered Champion Silver Medals in each of the Cattle, Horse, Sheep, Goat and Pig Sections.

Shorthorns were again disappointing in numbers, but the quality of the exhibits was in keeping with the best traditions of the breed. Mr Albert James Marshall, Bridgebank, Stranraer, with "Brawith Boy," 249,157 (Fig. 61), was again successful in obtaining the Championship. This well-developed 18 months old bull was bred by Mr H. S. Black, Banchory, Coupar-Angus, his sire being "Collynie Democrat," 243,063, and dam "Schivas Bonnie Bud," 116,272. In addition to the Duke of York Champion Silver Medal "Brawith Boy" was awarded the Duthie Perpetual Challenge Cup, the Shorthorn Society's Special Prize of £20 for best male animal and the Tweeddale Gold Medal. Mr Marshall also exhibited the Reserve Champion animal, this being "Cruggleton Searchlight," 236,500, a red roan, four-year-old, home-bred bull. The winner of the Shorthorn Society's Special Prize of £20 for best female was "Larmie's Joy," 143,420, a two-year-old heifer entered by Mr W. M'Nair Snadden of The Coldoch, Blair Drummond, and bred by Mr John Steel, Westerton of Cowie, Bannockburn. Messrs J. Baird & Co. (Falkirk) Ltd., Bantaskin, Falkirk, had the distinction of winning outright the Emilio R. Casares, Jun., 'Junior Champion Cup,' offered for best yearling bull which had passed the Tuberculin Test. The winning animal on this occasion was "Killineer Pasha," bred by Mr John Fillans Barr, Killineer House, Drogheda, Co. Louth.

The most outstanding display in the cattle section was that provided by Aberdeen-Angus cattle. Rarely has there been seen such an excellent and comprehensive parade of these cattle at a Highland Show. The nine classes attracted a total entry of 113, and there were few absentees. It is worthy of note that out of this large number the Champion and Reserve Champion animals came from the female classes. The former was the previous year's Reserve Champion, "Elinka of Doonholm," 87,315 (Fig. 62), a beautiful five-year-old cow, shown in fine condition. Owned and bred by Colonel Norman Kennedy, D.S.O., of Doonholm, Ayr, she was got by "Eryn of Doonholm," 59,161, out of "Elmina of Doonholm," 76,615. In addition to gaining the Championship, Colonel Kennedy became the first winner of the new 'Angus'

Perpetual Silver Challenge Cup, presented by the Angus Agricultural Association. He also secured the Aberdeen-Angus Cattle Society's Champion Gold Medal, and the Falconer L. Wallace Champion Silver Cup for best female. The Reserve Champion was "Erective of Harviestoun," 97,061, an attractive two-year-old heifer exhibited and bred by Mr J. E. Kerr of Harviestoun, Dollar. The Ballindalloch Cup for best bull was awarded to Mrs D. A. J. Cunningham-Jardine, Jardine, Lockerbie, for her three-year-old bull "Jujuy," 74,424. The Silver Challenge Cup given by Senor Eduardo Estanguet, Argentina, went to the bull, "Primus of Leven," 78,679, the property of Mr Francis W. Walker of Leys, Leys Castle, Inverness. The Ballindalloch Cup for best cow, for which "Elinka of Doonholm" was not eligible, having won it at Inverness Show, was awarded to "Gammer Debera," 92,534, a three-year-old cow entered and bred by Mr James Beddie, Banks, Strichen. The Silver Cup, presented by Mr W. Gilchrist Macbeth for best group of Aberdeen-Angus cattle, consisting of one bull and two females, was secured by Captain F. B. Atkinson, The Home Farm, Gallowhill, Morpeth.

There was a good entry of Galloways, especially in the classes for females, and the quality of the animals forward reached a very high standard. The Supreme Champion and winner of the Dr Gillespie Memorial Challenge Cup, was found amongst the aged bulls, this being "Excelsior of Blair," 16,401 (Fig. 63). A massive home-bred six-year-old bull, the property of Mr James Black, Blair, Maybole, he was sired by "Barmark Ivanhoe," 14,129, his dam being "Sprightly," 27,919. The Galloway Cattle Society's Silver Challenge Cup was won by the Reserve for Championship Honours, "Nazette 3rd of Castle Milk," 30,930, a nicely shaped seven-year-old cow exhibited by Sir John W. Buchanan-Jardine, Bart.

Belted Galloways were moderately represented. The Duke of York Champion Silver Medal and the Knockbrex Challenge Cup were won by Captain P. G. Barton of Auchenskeoch, Dalbeattie, with his splendid four-year-old bull, "Gartmore Benet," 901 B (Fig. 64). Bred by Sir August Cayzer, Bart., Gartmore, the sire of this bull was "Gartmore Admiral II.," 85 B, and dam "Gartmore Mary II.," 1038 B. Mr J. Faed Sproat, Boreland of Anwoth, Gatehouse, Galloway, was the exhibitor of the Reserve Champion, "Mochrum Cissie of Craigeach," 3014 B, a two-year-old heifer bred by the Marquis of Bute, K.T. With this heifer Mr Sproat became the first winner of the new Silver Challenge Cup presented to the Society by General Sir Ian Hamilton, G.C.B.

With an entry of 47, Highland Cattle formed an attractive feature of the Show. The exhibitors of both the Champion and Reserve Champion animals came from the same county—Argyll. Mr Thomas E. Nelson of Achnacloich, Connel, won the Duke of York Champion Silver Medal and the Highland Cattle Society's Perpetual Victory Challenge Cup for females. The winning animal was one of his own breeding, a handsome two-year-old heifer, "Sweetheart of Achnacloich," 10,392 (Fig. 65), got by "Culnadalloch II. of Achnacloich," 3441, out of "Maireared V. of Achnacloich," 10,389. The Reserve to the Champion and winner of the Highland Cattle Society's Perpetual Victory Challenge Cup for males was "An Bàidheach of Killundine," 3657, a very good two-year-old bull, the property of Mrs Lees-Milne of Killundine, Drimnin.

Entries in the Ayrshire Cattle classes numbered 70. Although there were many absentees, the general quality of the animals forward was a credit to the breed. Mr James M'Alister, Meikle Kilmory, Rothesay, who won the Championship at Inverness the previous year, again secured the Premier Honour with the same animal, "Meikle Kilmory Rosary," 91,252 (Fig. 66). This famous brown and white ten-year-old cow, bred by Mrs M'Alister, was got by "Carston General Haig," 20,783, her dam being "Meikle Kilmory Rosie 5th," 49,112. "Meikle Kilmory Rosary," in addition to the Championship and the Ayrshire Cattle Herd-Book Society's Special Prize of £20 for best female, also won one of the Dundee Citizens' Perpetual Silver Challenge Cups referred to on page 358. She, however, was not eligible to compete for the Cowhill Challenge Cup, having already won that trophy, and accordingly this Cup, along with the Ayrshire Cattle Herd-Book Society's corresponding prize for best male, went to the animal next in order of merit, "Bargenoch Blue Ribbon," 31,923, a grand brown and white bull belonging to Mr Adam W. Montgomerie of Lessnessock, Ochiltree.

Both in regard to numbers and quality British Friesians gave a highly meritorious display. On this occasion the Champion animal was found in the male classes—"Branchal Ver Klaske," 32,343 (Fig. 67), a well-balanced six-year-old bull, the property of The Pathhead and Sinclairtown Reform Co-operative Society, Ltd., 102 Commercial Street, Kirkcaldy. This animal, which also gained for his owners The MacRobert Champion Silver Bell and the Breed Society's Special Prize of £5 for best male animal, was bred by Mr John Telfer, Branchal, Kilmacolm, his sire being "Bladen Lord Verwachting," 13,233 P.I., R.M., and dam "Dunninald Klaske," 44,710. The winner of the Breed Society's Special Prize of £5 for best female went to the runner-up for Championship honours, "Findlay Fluky," 71,214, an aged cow exhibited by Mr John Christison, Crossveggate, Milngavie. With three home-bred heifers the Trustees of Sir Alasdair W. MacRobert, Bart., Tarland, again secured the British Friesian Cattle

Society's Silver Challenge Cup for best group of three British Friesian animals.

Owing to insufficient entries the Red Poll classes were cancelled.

There was a very good entry of Fat Cattle. The Duke of York Champion Silver Medal was obtained by Mr Francis N. M. Gourlay, Kirkland, Tynron, Thornhill, Dumfriesshire, with "Favourite 5th of Kirkland," 34,404 (Fig. 68). This pure-bred Galloway two-year-old heifer was bred by exhibitor, her sire being "Enigma of Dormont," 17,279, and dam "Fenella 5th of Craigneston," 27,569.

Mr James M'Alister, Meikle Kilmory, Rothesay, with "Meikle Kilmory Rosary," 91,252 (Fig. 66), gained, for the second year in succession, the Edinburgh Corporation Perpetual Gold Challenge Cup, offered for best tuberculin free Dairy Cow in Milk.

HORSES.

The total entry of Horses was a little disappointing, for although it exceeded that of Inverness Show by 55, it did not reach the total at the Show held in the Perth district in 1924.

Although the Clydesdale section attracted only a fair entry, no fault could be found with the quality of the horses forward at the Show. As in 1932, the two-year-old and yearling colt classes claimed the majority of entries in the male section. "Craigie Realisation" (Fig. 69), an excellent brown yearling colt, was a worthy winner of the Duke of York Champion Silver Medal, The Paisley Perpetual Gold Challenge Cup and the Clydesdale Horse Society's Cawdor Challenge Cup for males. The property of, and bred by Mr James Kilpatrick, Craigie Mains, Kilmarnock, he was got by "Craigie Ambition," 21,195, out of "Craigie Fragrance," 58,559. Mr Alexander Clark, Strathore House, Thornton, Fife, was the exhibitor of the Reserve Champion, "Strathore Majestic," 22,195, a two-year-old colt bred by Mr Thomas Graham, Balone, St Andrews. The William Taylor Memorial Prize and Certificate offered this year for best colt in the two-year-old and yearling classes went to the Champion animal, "Craigie Realisation."

There was a good exhibit of Clydesdale Geldings, probably one of the best seen at recent Shows. Mr James Clark, Windlaw, Carmunnock, was awarded the Championship for his five-year-old roan gelding "Willie" (Fig. 70). Shown in fine condition, he was bred by Messrs M'Millan Brothers, Earrabus, Islay, and sired by "Braidley Eminent," 20,514, out of "Mona's Queen," 33,779. The next best animal in this section was found in the three-year-old class—a dark-brown gelding, "Ben," entered by Mr William Wilson, Black Byres, Barrhead, and bred by Mr Robert Bowness, Beck Farm, Wigton, Cumberland.

The entry of Clydesdale Mares and Fillies was surprisingly short of last year's figure—43 compared with 53 at Inverness. Mr Alexander Murdoch, East Hallside, Cambuslang, was again the most successful exhibitor, in that he not only secured the Championship for the third time in succession, but also won outright the Cawdor Challenge Cup offered by the Clydesdale Horse Society for females. On this occasion the winning animal was "Faraway" (Fig. 71), a grand, straight moving, dark-brown yearling filly, bred by Messrs T. & M. Templeton, Sandyknowe, Kelso. Sired by the noted "Benefactor," 20,867, her dam was "Rosabell," 56,233. As in the previous year "Lane Lucky Girl" was runner-up to the Champion. A fine type of Clydesdale female, this brown four-year-old mare was exhibited by her breeder, Mr G. M. Beck, The Lane, Ravenstonedale, Westmorland.

A class was provided in the Prize List for Shire Geldings, but this had to be cancelled on account of insufficient entries.

Six entries were obtained in the class for Suffolk Geldings, four of which were made by a local firm, Messrs Thomas Muir, Son, & Patton, Ltd., Nethergate, Dundee, who, with "Rob Roy" (Fig. 72), a powerful six-year-old gelding, succeeded in winning the Duke of York Champion Silver Medal.

Hunters, being well represented both in regard to numbers and quality of exhibits, gave a highly creditable display. After keen competition, The Duke of York Champion Silver Medal and the Dumfries Centenary Silver Challenge Cup were awarded to "Mark Anthony" (Fig. 73). Exhibited and bred by Miss Thomson Currie, Clatto, Cupar, Fife, this outstanding three-year-old gelding was sired by "Ardavon," the dam being "Meg Merrilees." The Reserve Champion animal, "Ramoneur," an eight-year-old black gelding, was bred by Mr John Robson, Newton, Tarset, and shown by another Fifeshire exhibitor, Mr W. C. G. Black, Chapel, Kingskettle. Miss Thomson Currie also won the Hunters' Improvement, &c., Society's Champion Medal offered for best filly, three-year-old and under, with "Merry Ann," 7938, a dark-brown two-year-old filly.

The six classes for Highland and Western Island Ponies attracted only 26 entries. Mr T. G. Wilson, Carbeth Home Farm, Balfron Station, obtained the Championship with "Moldagh," 5939 (Fig. 74), an excellent six-year-old mare, bred by Mr James M. Cairns, Ardlarach House, Island of Luing. This animal, whose sire was "Dougald of Luing," 1218, and dam "Moira," 5090, also gained for her owner the Highland Pony Society's Special Prize of £8 for best female.

The runner-up to " Moldagh " was an aged grey mare, " Staffin Princess," 6236, exhibited as Extra Stock. She was shown by Major D. G. Moncrieff Wright, M.C., of Kinmonth, Bridge of Earn, and her breeder was Mr John Macdonald, Sarstle, Skye. Mr Donald Mackelvie, New Lanark, Lamlash, won the Highland Pony Society's Special Prize of £8 for best male exhibit with an animal of his own breeding, " Ruarie," 1835, a two-year-old grey colt.

Despite the fact that the entries of Shetland Ponies have shown a falling off in recent years, they continue to be of great interest to the many visitors to the Show. The Duke of York Champion Silver Medal and the Fife and Kinross Perpetual Gold Challenge Cup went to Mr J. E. Kerr of Harviestoun, Dollar, for "Harviestoun Pryde," 4544 (Fig. 75). A beautiful home-bred seven-year-old mare—she was got by "Helmet of Earlshall," 408, out of "Harviestoun Peggie," 4286. The runner-up for Championship honours was " Sonyad of Transy," 1105, an aged black stallion, the property of Mr William Mungall of Transy, Dunfermline, who, with that and two other entries, obtained the Special Prize of £10 given by ' Four Lovers of the Breed ' for best group of Shetland Ponies consisting of one male and two females.

There was only a moderate entry of Mares and Geldings in the Saddle Classes.

Classes for Hackneys-in-Harness were reinstated in the Prize List for this Show, and the entries obtained were more numerous than anticipated. Messrs R. & J. Hamilton, 410 Rutherglen Road, Glasgow, won the Duke of York Champion Silver Medal with " Glenavon Glory," G 223 (Fig. 76). Born in 1918, this stylish bay gelding was bred by Mr Enoch Glen, Kaim Park, Bathgate, the sire being " Iona," 12,869. " All Trumps," 26,894, a brown eight-year-old mare, entered by Mr Walter Macmillan, Carlestoun House, Torrance of Campsie, was Reserve Champion.

Some good specimens of heavy cart horses were on view in the special class provided for Draught Geldings-in-Harness. They were judged and paraded on Friday afternoon, the last day of the Show.

As usual the Jumping Competitions were a source of great interest. In order to encourage Scottish competitors there was introduced a special class confined to entrants permanently resident in Scotland. This and the other classes were well supported with entries.

For the first time in the history of the Society's Shows Sheep Dog Demonstrations were given. These took place on the Wednesday and Thursday evenings. This new venture was entirely successful, as the excellent displays given by Mr James M. Wilson, Moffat, with his dogs were most enthusiastically appreciated by the general public.

SHEEP, PIGS, &C.

Despite the early date of the Show, there was no falling off in regard to either the numbers or quality of the exhibits in the Sheep Section. The total entry was 396, which compared favourably with that of 366 at Perth Show in 1924.

Goats numbered 22, a few less than that of the previous year.

The section for Pigs included classes for only Large Whites and Large Blacks, and a total entry of 75 must be considered entirely satisfactory. One of the Cups presented by the citizens of Dundee (see page 358) was permanently offered for the best Large White pig and the first winner of this Cup was Mr John E. B. Cowper, Gogar Mains, Corstorphine. The winners of the Duke of York Champion Silver Medals for Sheep, Goats and Pigs are shown in Figs. 77 to 87.

There were many excellent exhibits in the sections for Poultry, Eggs, Dairy Produce, Honey, and Rural Industries. The Rabbit Section unfortunately was poorly supported with entries.

The work of the Horse-Shoeing and Shoe-Making Competitors was keenly followed and greatly appreciated by many interested onlookers.

With its many, varied and beautiful exhibits, the Horticultural Section was one of the most attractive and popular features of the Show.

One hundred competitors took part in the Live Stock Judging Competition, and the interest taken by young farmers and agricultural students in this competition is clearly demonstrated by the fact that the teams entering for the special team prizes are increasing in numbers each year.

On account of the large number of entrants, Buttermaking Competitions were held during each day of the Show. Great credit is due to the competitors for the high standard of efficiency attained by them.

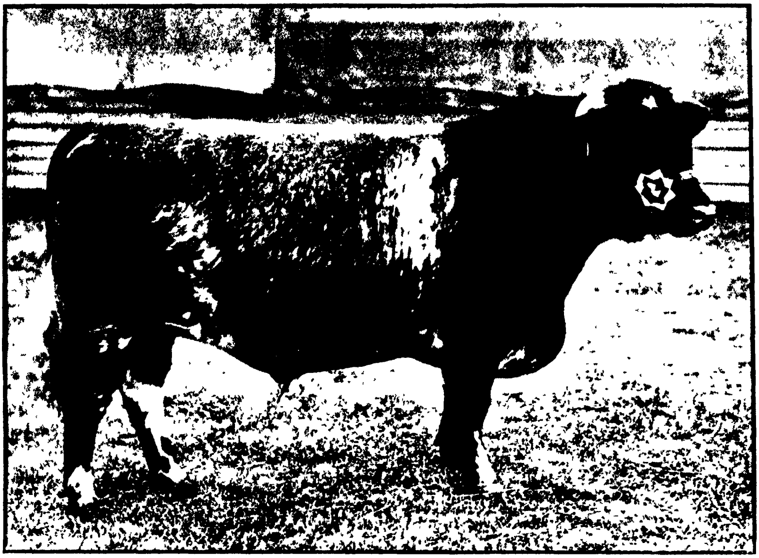

Fig. 61.—Shorthorn Bull, "Brawith Boy" 249,157.

Winner of the Duke of York Champion Silver Medal for best Shorthorn animal, Dundee Show, 1933. The property of Mr Albert James Marshall, Bridgebank, Stranraer. Bred by Mr H. S. Black, Banchory, Coupar-Angus. Age one year and six months.

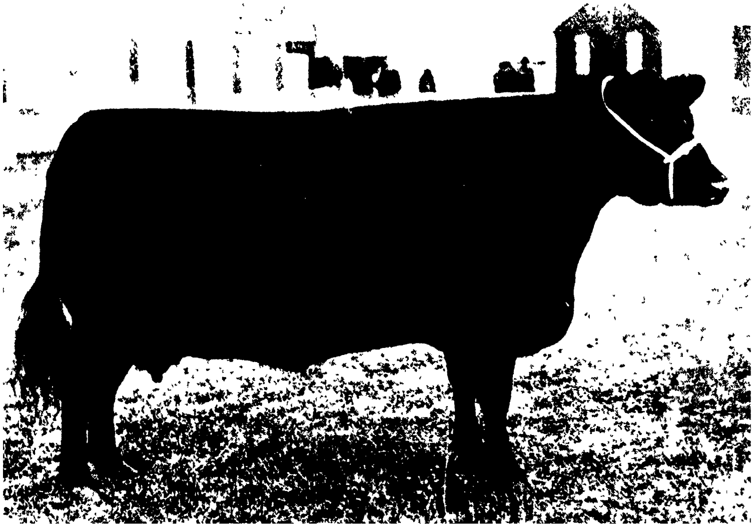

Fig. 62.—Aberdeen-Angus Cow, "Elinka of Doonholm" 87,315.

Winner of the Duke of York Champion Silver Medal for best Aberdeen-Angus animal, Dundee Show, 1933. Bred by and the property of Colonel Norman Kennedy, D.S.O., of Doonholm, Ayr. Age five years and five months.

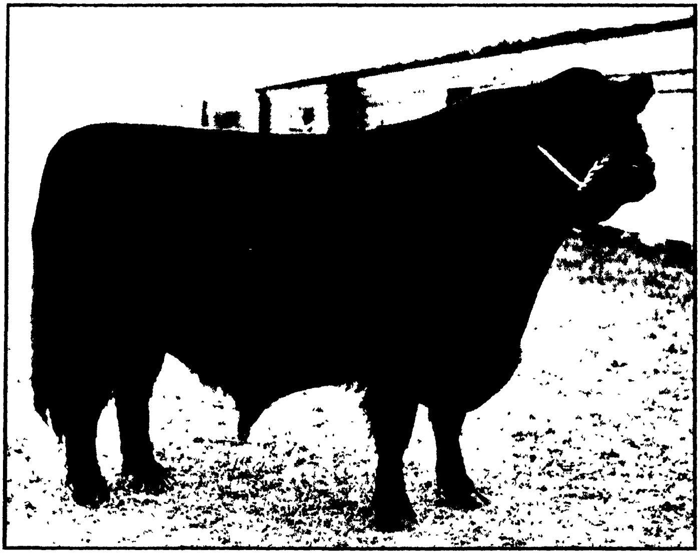

Fig. 63.—GALLOWAY BULL, "EXCELSIOR OF BLAIR" 16,401.

Winner of the Duke of York Champion Silver Medal for best Galloway animal, Dundee Show, 1933. The property of Mr James Black, Blair, Maybole. Bred by Mr John Black, Blair, Maybole. Age six years and four months.

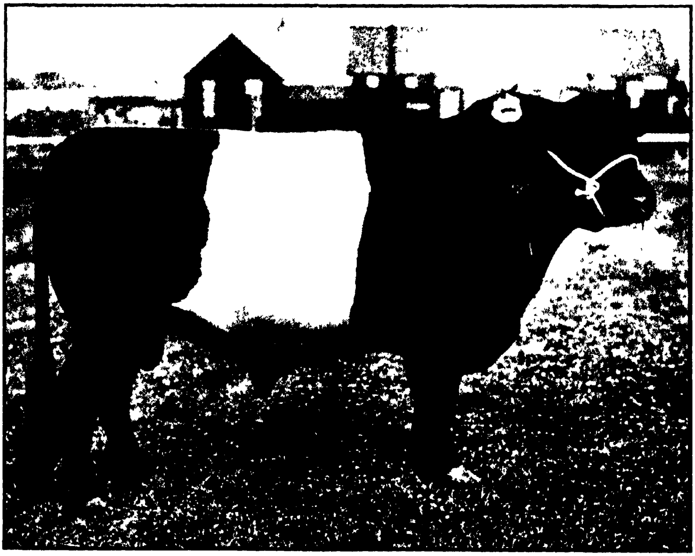

Fig. 64.—BELTED GALLOWAY BULL, "GARTMORE BENET" 901 B.

Winner of the Duke of York Champion Silver Medal for best Belted Galloway animal, Dundee Show, 1933. The property of Captain P. G. Barton of Auchenskeoch, Dalbeattie. Bred by Sir August Cayzer, Bart., Gartmore, Stirling. Age four years and three months.

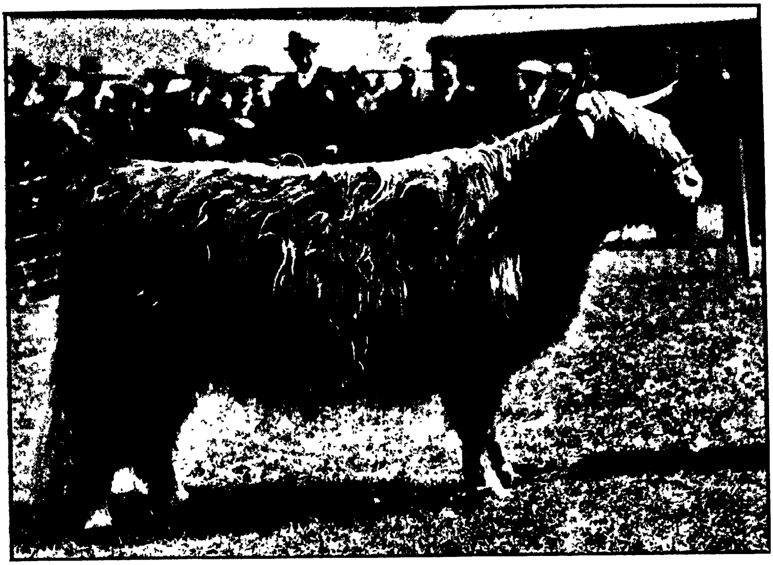

Fig. 65.—Highland Heifer, "Sweetheart of Achnacloich" 10,392.

Winner of the Duke of York Champion Silver Medal for best Highland animal, Dundee Show, 1933. Bred by and the property of Mr Thomas E Nelson of Achnacloich, Connel, Argyll Age two years and five months.

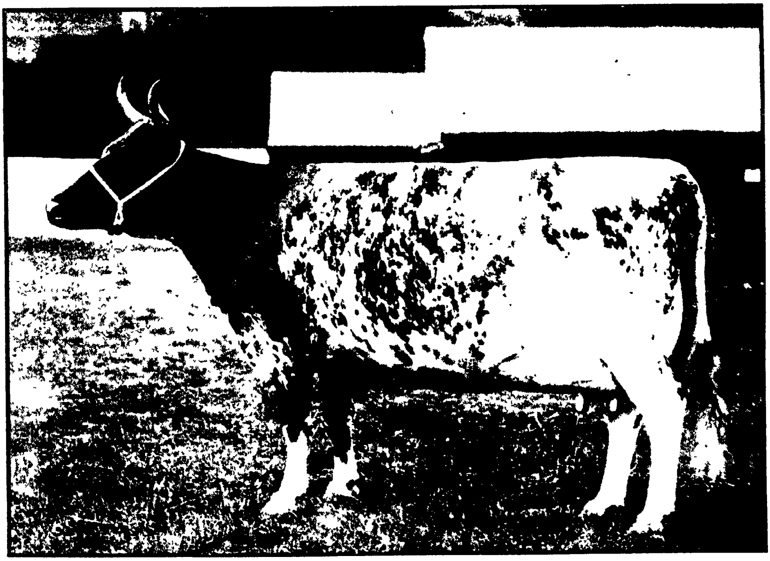

Fig. 66.—Ayrshire Cow, "Meikle Kilmory Rosary" 91,252.

Winner of the Duke of York Champion Silver Medal for best Ayrshire animal, Dundee Show, 1933. The property of Mr James M'Alister, Meikle Kilmory, Rothesay. Bred by Mrs M'Alister, Meikle Kilmory, Rothesay. Age ten years and two months

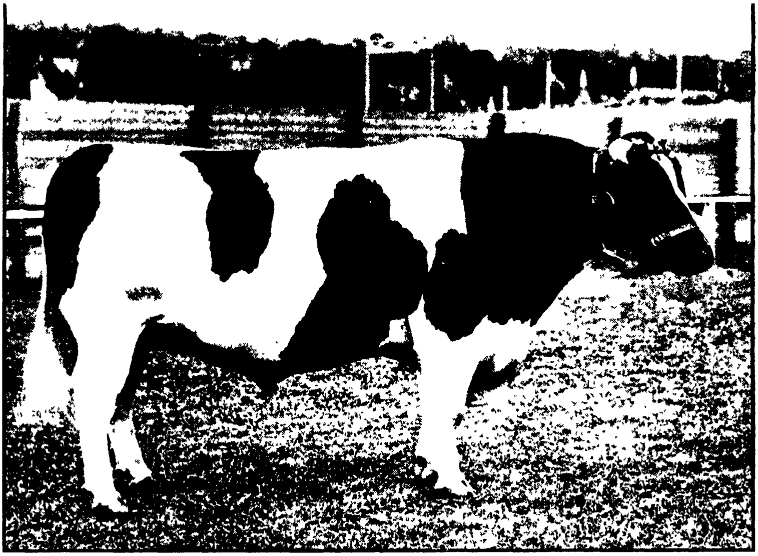

Fig. 67.—British Friesian Bull, "Branchal Ver Klaske" 32,343.

Winner of the Duke of York Champion Silver Medal for best British Friesian animal, Dundee Show, 1933. The property of Pathhead & Sinclairtown Reform Co-operative Society, Limited, 102 Commercial Street, Kirkcaldy. Bred by Mr John Telfer, Branchal, Kilmacolm. Age six years.

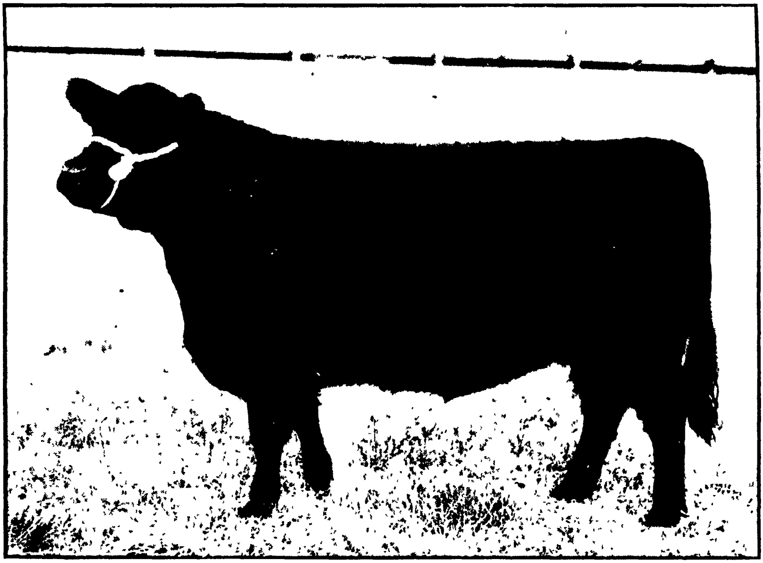

Fig. 68.—Galloway Heifer, "Favourite 5th of Kirkland" 34,401.

Winner of the Duke of York Champion Silver Medal for best Fat animal, Dundee Show, 1933. Bred by and the property of Mr Francis N. M. Gourlay, Kirkland, Tynron. Age two years and two months.

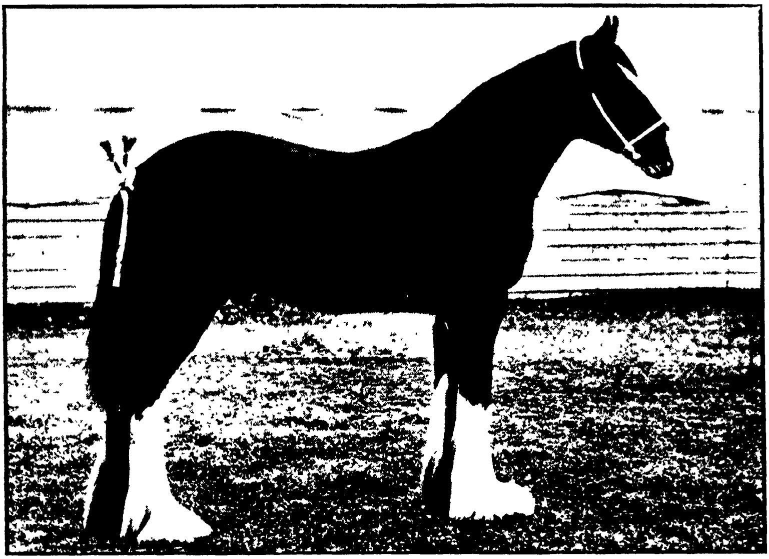

Fig. 69.—CLYDESDALE ENTIRE COLT, "CRAIGIE REALISATION."

Winner of the Duke of York Champion Silver Medal for best Clydesdale Stallion or Colt, Dundee Show, 1933. Bred by and the property of Mr James Kilpatrick, Craigie Mains, Kilmarnock. Age one year and one month.

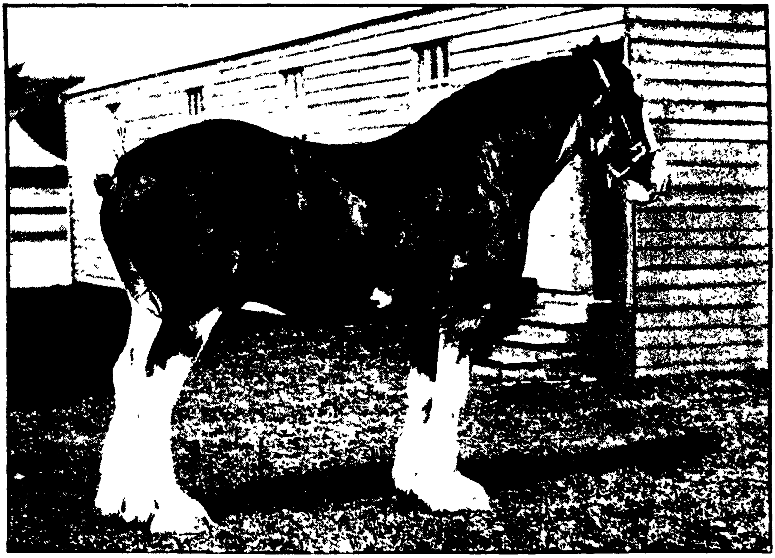

Fig. 70.—CLYDESDALE GELDING, "WILLIE."

Winner of the Duke of York Champion Silver Medal for best Clydesdale Gelding, Dundee Show, 1933. The property of Mr James Clark, Windlaw, Carmunnock Bred by Messrs M'Millan Brothers, Eorrabus, Islay. Age five years and one month.

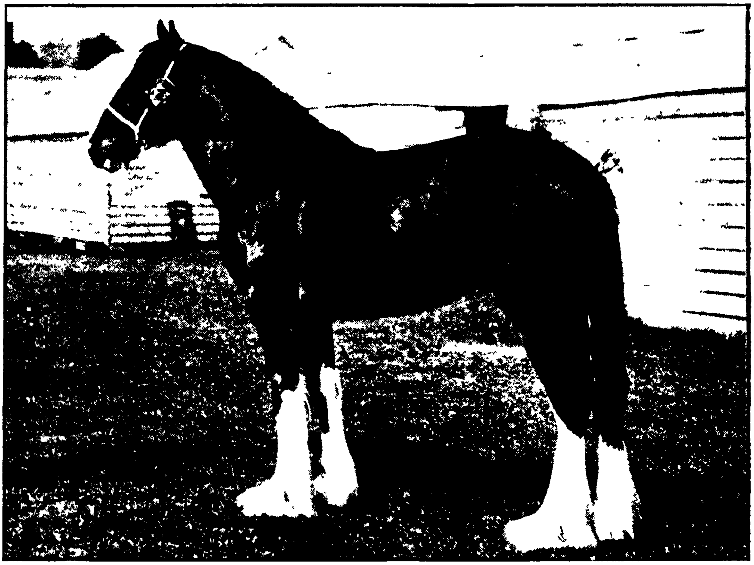

Fig. 71.—Clydesdale Filly, "Faraway."

Winner of the Duke of York Champion Silver Medal for best Clydesdale Mare or Filly, Dundee Show, 1933. The property of Mr Alexander Murdoch, East Hallside, Cambuslang. Bred by Messrs T & M Templeton, Sandyknowe, Kelso Age one year and two months.

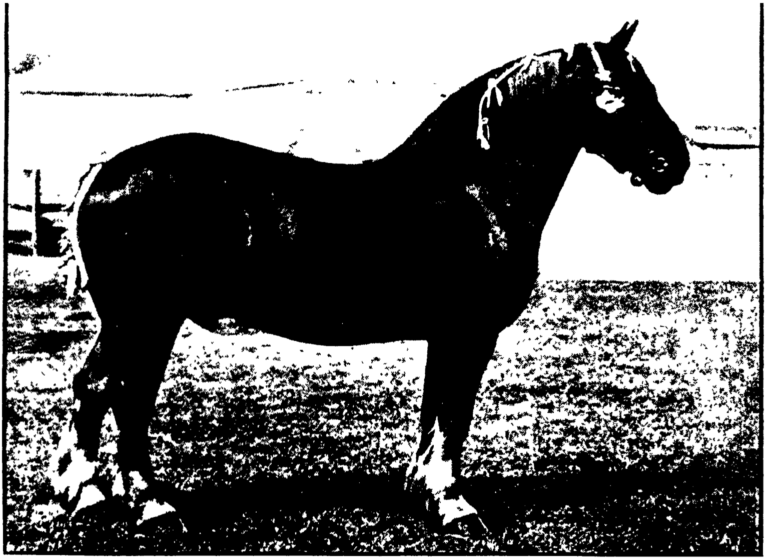

Fig 72.—Suffolk Gelding, "Rob Roy."

Winner of the Duke of York Champion Silver Medal for best Suffolk Gelding, Dundee Show, 1933. The property of Messrs Thomas Muir, Son, & Patton, Limited, Nethergate House, Dundee Age six years.

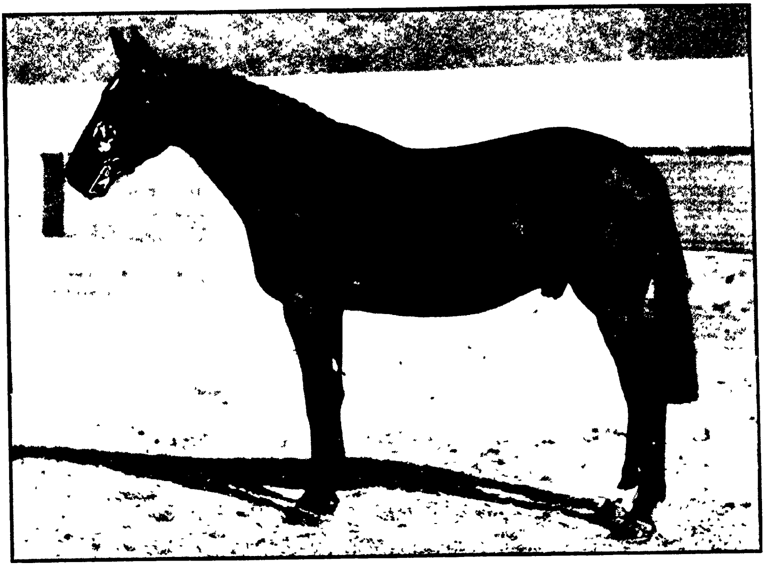

Fig. 73.—HUNTER GELDING, "MARK ANTHONY."

Winner of the Duke of York Champion Silver Medal for best Hunter, Dundee Show, 1933. Bred by and the property of Miss Thomson Currie, Clatto, Cupar, Fife. Age three years and two months.

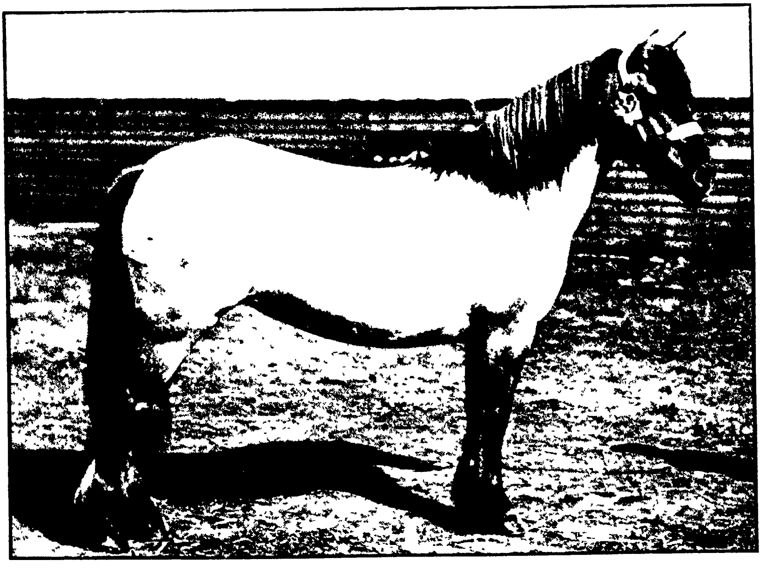

Fig. 74.—HIGHLAND PONY YEILD MARE, "MOLDAGH" 5939.

Winner of the Duke of York Champion Silver Medal for best Highland or Western Island Pony, Dundee Show, 1933. The property of Mr T. G. Wilson, Carbeth Home Farm, Balfron Station. Bred by Mr James M. Cairns, Ardlarach House, Isle of Luing. Age six years.

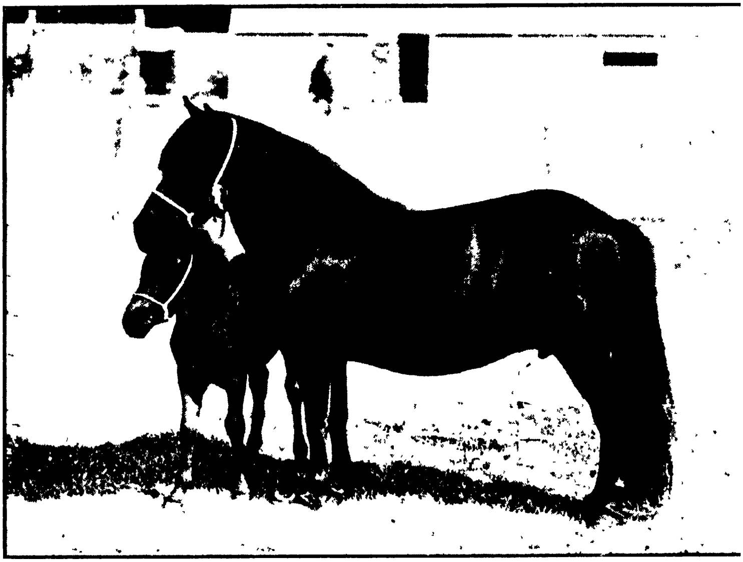

Fig. 75.—SHETLAND PONY MARE WITH FOAL AT FOOT, "HARVIESTOUN PRYDE" 1544.

Winner of the Duke of York Champion Silver Medal for best Shetland Pony, Dundee Show, 1933. Bred by and the property of Mr J. E Kerr of Harviestoun, Dollar. Age seven years and two months.

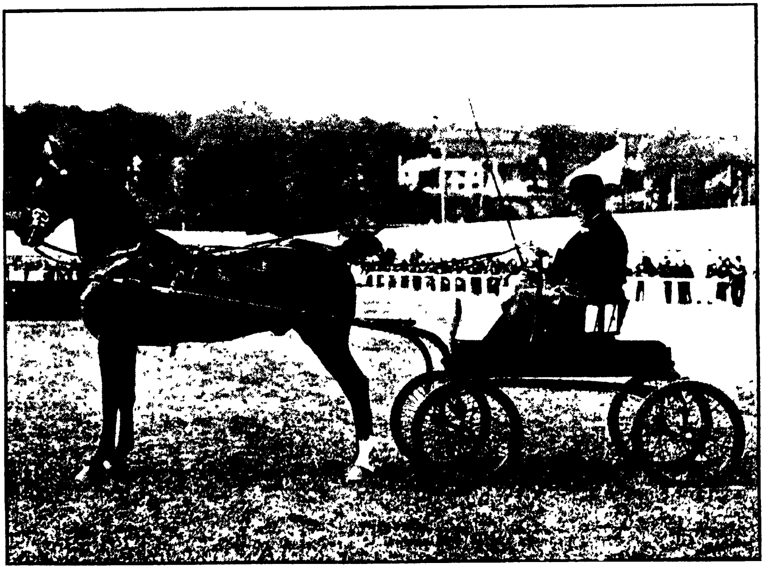

Fig. 76.—GELDING IN HARNESS, "GLENAVON GLORY" G 223.

Winner of the Duke of York Champion Silver Medal for best animal in the Classes for Horses in Harness, Dundee Show, 1933. The property of Messrs R. & J Hamilton, 410 Rutherglen Road, Glasgow. Bred by Mr Enoch Glen, Kaim Park, Bathgate. Age fifteen years.

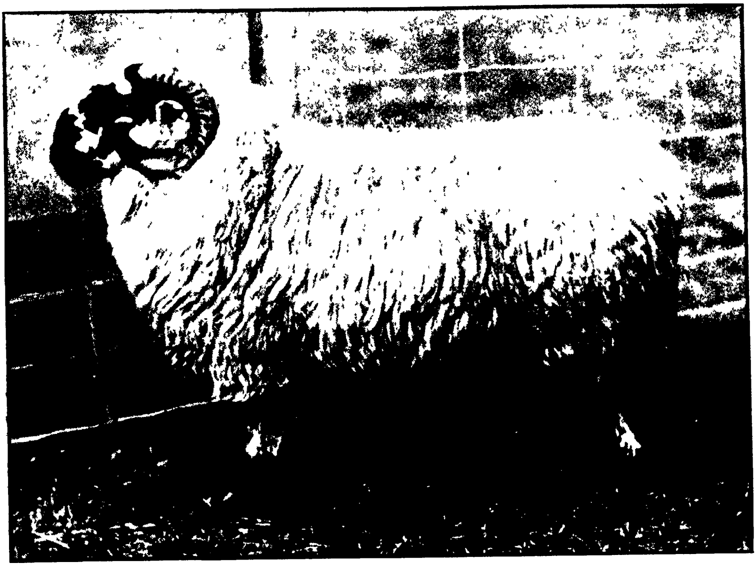

Fig. 77.—Blackface Shearling Tup.

Winner of the Duke of York Champion Silver Medal for best Blackface Sheep, Dundee Show, 1933. Bred by and the property of Mr Matthew G. Hamilton, Woolfords, Cobbinshaw.

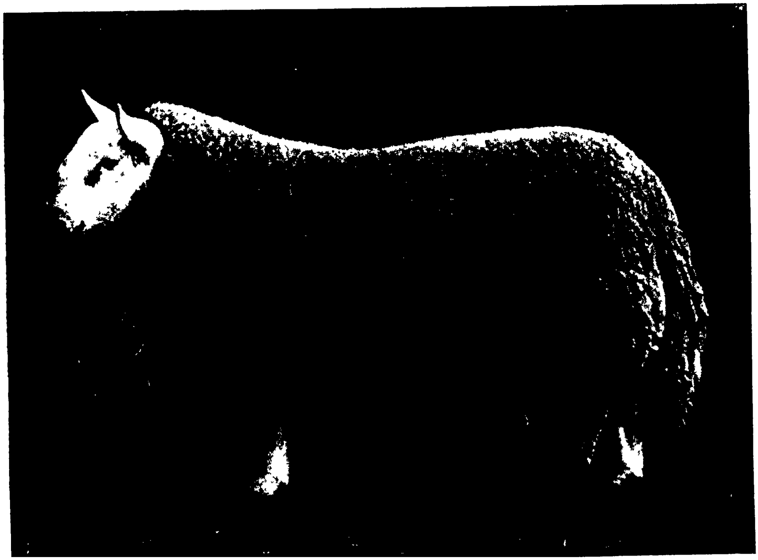

Fig 78.—Cheviot Shearling Tup.

Winner of the Duke of York Champion Silver Medal for best Cheviot Sheep, Dundee Show, 1933. Bred by and the property of Mr Walter S. Douglas, Hindhope, Jedburgh.

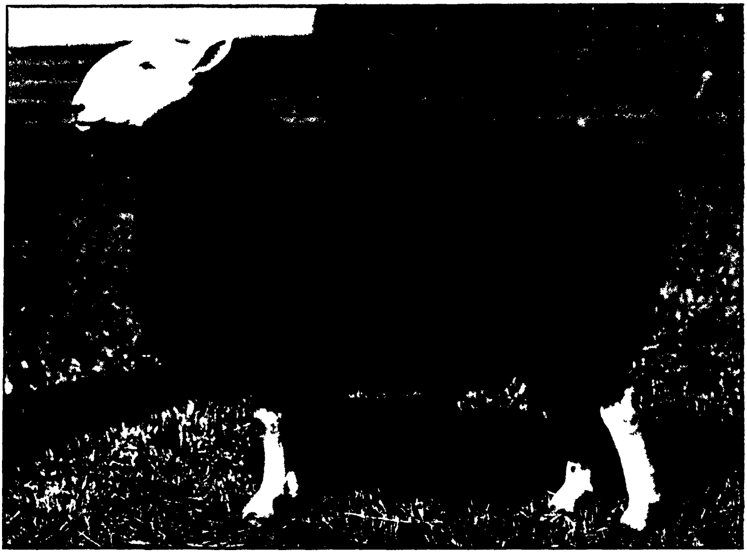

Fig. 79.—Border Leicester Tup, "Noonday Sun."

Winner of the Duke of York Champion Silver Medal for best Border Leicester Sheep, Dundee Show, 1933 The property of Messrs James Howie & Sons, Muirside, Dumfries. Bred by Mr A. B. Howie, Eshott Brocks, Felton, Morpeth. Age two shear.

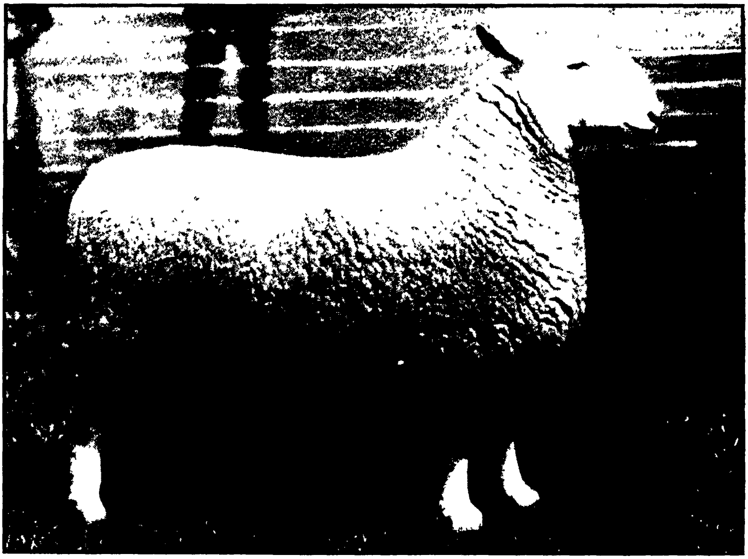

Fig. 80 —Half-Bred Shearling Tup.

Winner of the Duke of York Champion Silver Medal for best Half-Bred Sheep, Dundee Show, 1933. Bred by and the property of Mr John Elliot, Blackhaugh, Clovenfords.

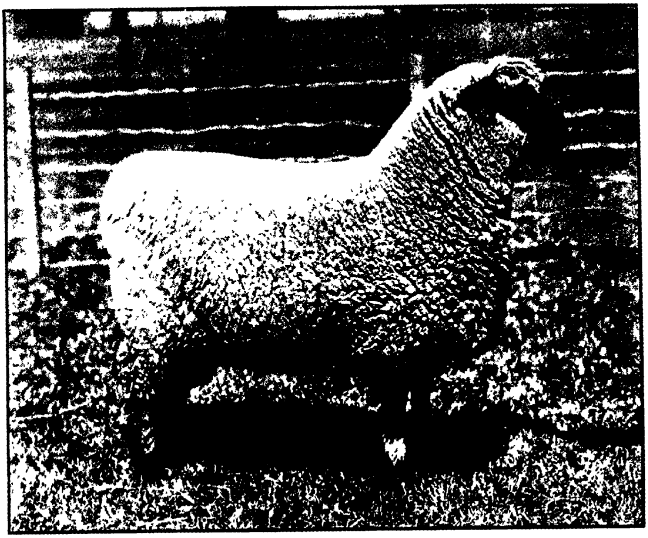

Fig. 81.—Oxford Down Shearling Tup.

Winner of the Duke of York Champion Silver Medal for best Oxford Down Sheep, Dundee Show, 1933 Bred by and the property of Messrs T. & M. Templeton, Sandyknowe, Kelso.

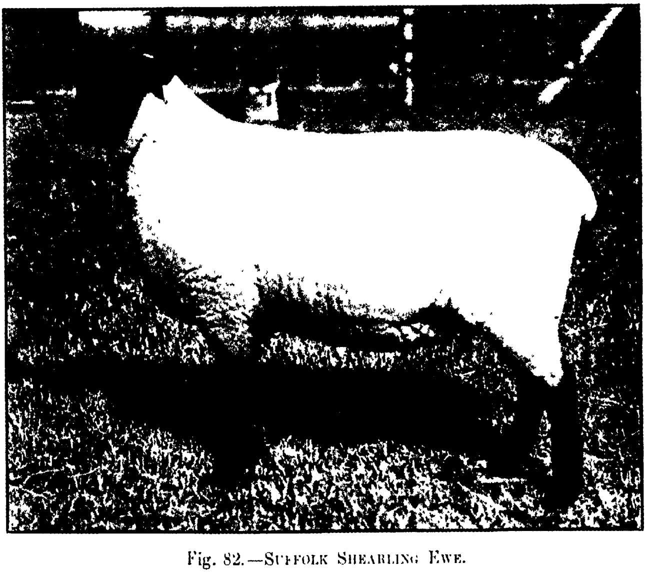

Fig. 82.—Suffolk Shearling Ewe.

Winner of the Duke of York Champion Silver Medal for best Suffolk Sheep, Dundee Show, 1933. Bred by and the property of Sir Prince Prince-Smith, Bart., Southburn House, Driffield, East Yorkshire.

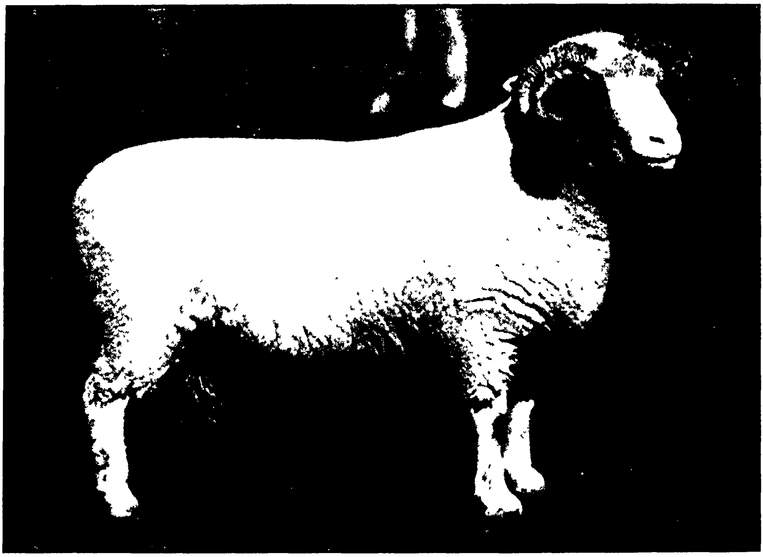

Fig. 83.—Dorset Horn Tup.

Winner of the Duke of York Champion Silver Medal for best Dorset Horn Sheep, Dundee Show, 1933. The property of The Earl of Elgin and Kincardine, C.M.G., Broomhall, Dunfermline. Age two shear.

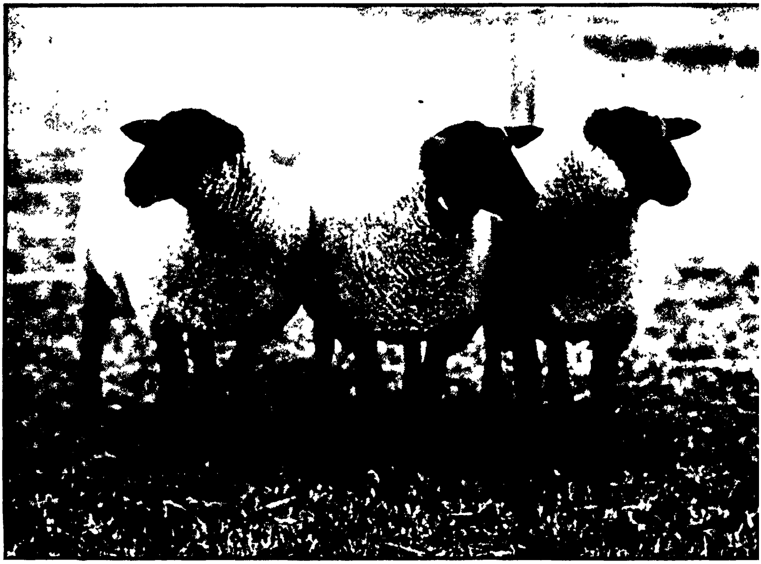

Fig. 84.—Three Suffolk Lambs.

Winner of the Duke of York Champion Silver Medal for best pen of Fat Sheep, Dundee Show, 1933. Bred by and the property of Messrs R. & W. Whitton, East Nevay, Eassie, Angus.

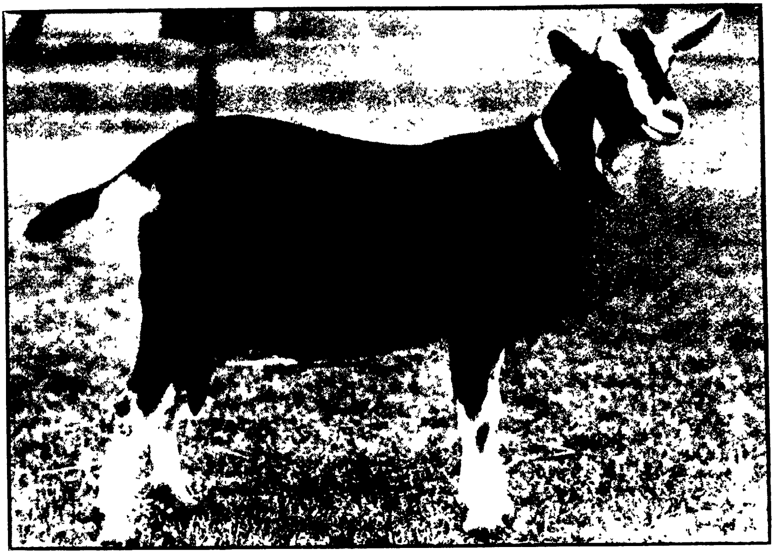

Fig. 85.—British Alpine Goat, "Dupplin Eschscholtzia" BA 169.

Winner of the Duke of York Champion Silver Medal for best animal in the Goat Classes, Dundee Show, 1933. Bred by and the property of Margaret, Lady Forteviot, Galloway House Garlieston. Age three years and two months.

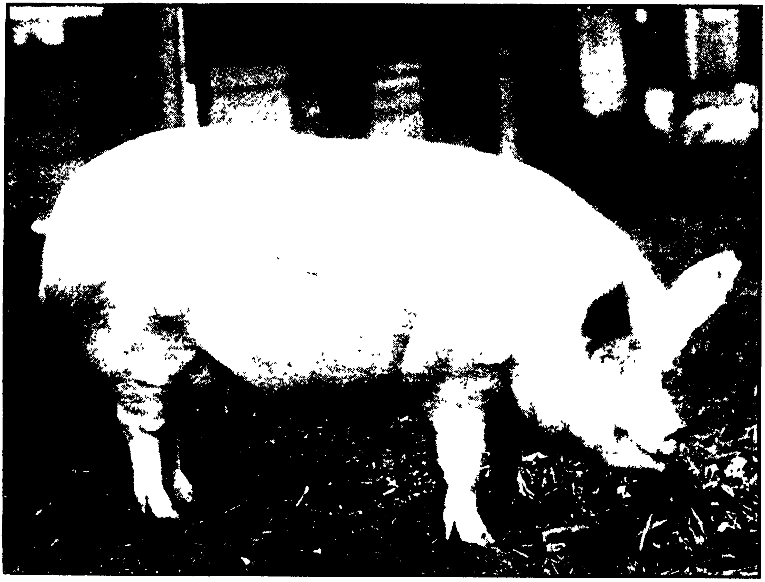

Fig. 86.—Large White Sow, "Hardwick Primula" 205,304.

Winner of the Duke of York Champion Silver Medal for best Large White Pig, Dundee Show, 1933. The property of Mr John E. B. Cowper, Gogar Mains, Corstorphine, Edinburgh. Bred by Mr Leopold C Paget, Hardwick Grange, Clumber Park, Worksop. Age four years.

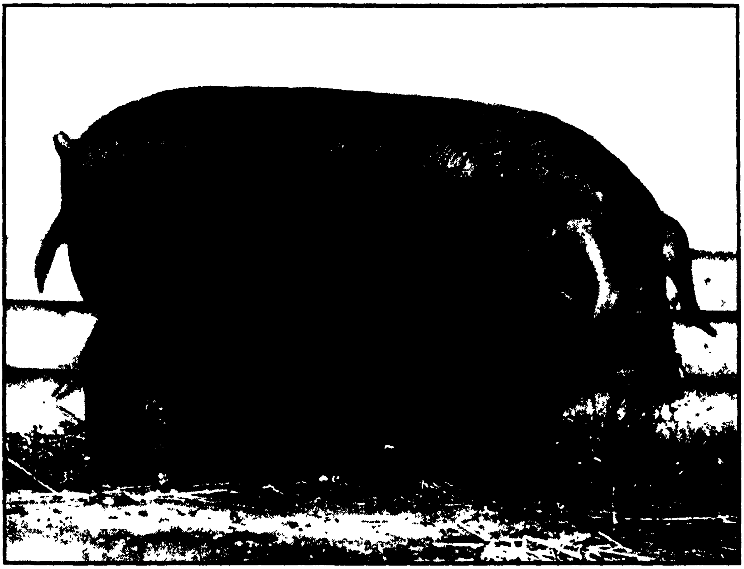

Fig. 87.—LARGE BLACK SOW, "YAM ERICA 17TH" K 62.

Winner of the Duke of York Champion Silver Medal for best Large Black Pig, Dundee Show, 1933. Bred by and the property of Messrs M'Caig & Goodchild, Foreside of Cairn, Forfar. Age one year and five months.

PREMIUMS AWARDED BY THE SOCIETY IN 1933.

DUNDEE SHOW.

20th, 21st, 22nd, and 23rd June 1933.

ABBREVIATIONS.—V., *Very Highly Commended.* H., *Highly Commended.* C., *Commended.*

CATTLE

SHORTHORN.

DUKE OF YORK CHAMPION SILVER MEDAL for best Shorthorn Animal.

No. 18 Marshall, Albert James, Bridgebank, Stranraer, " Brawith Boy " (249,157).

Reserve—No. 4 Marshall, Albert James, Bridgebank, Stranraer, " Cruggleton Searchlight " (236,500).

The Duthie Perpetual Challenge Cup, value £150, *for best Animal in the Shorthorn Classes, " Extra Stock " being eligible to compete.* This Cup was gifted by the late Mr William Duthie, Collynie.

No. 18 Marshall, Albert James, Bridgebank, Stranraer, " Brawith Boy" (249,157).

Best Shorthorn Bull in the Show, entered or eligible for entry in Coates's Herd-Book—£20 given by the Shorthorn Society.

No. 18 Marshall, Albert James, Bridgebank, Stranraer, " Brawith Boy " (249,157).

Silver Medal *to the Breeder of the Winner of above Prize*—given by the Shorthorn Society.

No. 18 Black, H. S., Banchory, Coupar-Angus.

Tweeddale Gold Medal, value about £25, *for best Shorthorn Bull. Annual free income from fund of* £500.

No. 18 Marshall, Albert James, Bridgebank, Stranraer, " Brawith Boy " (249,157).

Breeder of best Bull of any age in Classes 1 *to* 5—The Silver Medal.

No. 18 Black, H. S., Banchory, Coupar-Angus.

CLASS 1. BULL, born before 1st December 1930.—PREMIUMS, £15, £10, £5, and £3.

1st No. 4 Marshall, Albert James, Bridgebank, Stranraer, " Cruggleton Searchlight " (236,500).
2nd No. 3 Macintyre, A. M., Towie Barclay, Auchterless, " Crieffvechter Blockade " (236,311).
3rd No. 5 Robertson, Major W. B., M.C., Colton, Dunfermline, " Balcairn Boleta " (241,653).
4th No. 1 Baird, J., & Co. (Falkirk), Limited, Bantaskin, Falkirk, " Doune Mercury " (243,649).
H No. 2 Fletcher, Captain A. M. Talbot, of Saltoun, Saltoun Hall, Pencaitland, " Calrossie Faithful Fellow " (235,680).

CLASS 2. BULL, born on or after 1st December 1930 and before 1st April 1931.—PREMIUMS, £15, £10, £5, and £3.

1st No. 6 Marshall, Albert James, Bridgebank, Stranraer, " Cruggleton Alphy " (250,030).
2nd No. 7 Piper, James, of The Grange, Burntisland, "Letham Founder" (245,372).

CLASS 3. BULL, born on or after 1st April 1931 and before 1st December 1931.—PREMIUMS, £12, £8, £4, and £2.

1st No. 9 Barr, John Fillans, Killineer House, Drogheda, Co. Louth, " Killineer President " (251,743).
2nd No. 8 Baird, J., & Co. (Falkirk), Limited, Bantaskin, Falkirk, " Crieffvechter Desperado " (249,960).
3rd No. 11 Marshall, Albert James, Bridgebank, Stranraer, " Cruggleton Bayardo " (250,042).
4th No. 12 Marshall, Albert James, Bridgebank, Stranraer, " Cruggleton Penmore " (250,108).

CLASS 4. Bull, born on or after 1st December 1931 and before 1st April 1932.—PREMIUMS, £12, £8, £4, and £2.

1st No. 18 Marshall, Albert James, Bridgebank, Stranraer, " Brawith Boy " (249,157).
2nd No. 20 Stewart, Duncan M., Millhills, Crieff, " Millhills Opal."
3rd No. 17 Lovat, Lord, Beaufort Castle, Beauly, " Beaufort Legion."
4th No. 14 Baird, J., & Co. (Falkirk), Limited, Bantaskin, Falkirk, " Millhills Orlando."
H No. 16 Gordon, The Trustees of the late A. P., Bindal, Portmahomack, Ross-shire, " Balmuchy Prince Landlord."

The Emilio R. Casares, jun., " Junior Champion Cup," value £50, *for best Shorthorn Bull in Class 5, calved on or after 1st April of the year preceding the Show, that has passed the tuberculin test.* Given by Mr Emilio R. Casares, jun.

No. 21 Baird, J., & Co. (Falkirk), Limited, Bantaskin, Falkirk, " Killineer Pasha."

Reserve—No. 27 Kerr, J. E., of Harviestoun, Dollar, " Harviestoun St Colm."

CLASS 5. BULL, born on or after 1st April 1932.—PREMIUMS, £10, £6, £4, and £2.

1st No. 21 Baird, J., & Co. (Falkirk), Limited, Bantaskin, Falkirk, " Killineer Pasha."
2nd No. 27 Kerr, J. E., of Harviestoun, Dollar, " Harviestoun St Colm."
3rd No. 25 Jones, Peter Forbes, Dunmore Park, Larbert, " Larbert Clipper King."
4th No. 22 Dawson, George, Phingask, Fraserburgh, " Phingask Roll Call."
V No. 31 M'William, R. S., Garguston, Muir of Ord, " Garguston Brigadier."
H No. 35 Robertson, Major W. B., M.C., Colton, Dunfermline, " Scotston Officer."

Best Shorthorn Female in the Show, entered or eligible for entry in Coates's Herd-Book—£20 given by the Shorthorn Society.

No. 45 Snadden, W. M'Nair, of The Coldoch, Blair Drummond, Heifer, " Larmie's Joy " (143,420).

Silver Medal *to the Breeder of the winner of above Prize*—given by the Shorthorn Society.

No. 45 Steel, John, Westerton of Cowie, Bannockburn.

CLASS 6. COW, in Milk, born before 1st December 1929.—PREMIUMS, £12, £8, £4, and £2.

1st No. 37 Piper, James, of The Grange, Burntisland, " Gay Goldie " (100,257).
2nd No. 38 Stewart, Duncan M., Millhills, Crieff, " Millhills Lavender 3rd " (55,479).

CLASS 7. COW, in Milk, born on or after 1st December 1929 and before 1st December 1930.—PREMIUMS, £10, £5, £3, and £2.

1st No. 40 Snadden, W. M'Nair, of The Coldoch, Blair Drummond, " Calrossie Roan Flora " (130,764).
2nd No. 39 Marshall, Albert James, Bridgebank, Stranraer, " Paveta Goldie " (131,181).

CLASS 8. COW or HEIFER, born on or after 1st December 1930 and before 1st December 1931.—PREMIUMS, £10, £5, £3, and £2.

1st	No. 45	Snadden, W. M'Nair, of The Coldoch, Blair Drummond, Heifer, " Larmie's Joy " (143,420).
2nd	No. 44	Smith, R. Laidlaw, Pittodrie, Pitcaple, Heifer, " Schivas Lady Broadhooks " (136,571).
3rd	No. 43	Rosebery Estates, Dalmeny House, Edinburgh, Heifer, " Princess Hettie " (141,108).
4th	No. 42	Macintyre, A. M., Towie Barclay, Auchterless, Heifer, " Towiebarclay Broadhooks Pride " (140,798).
V	No. 46	Snadden, W. M'Nair, of The Coldoch, Blair Drummond, Heifer, " Coldoch Rosewood " (143,325).

CLASS 9. HEIFER, born on or after 1st December 1931 and before 1st April 1932.—PREMIUMS, £10, £5, £3, and £2.

1st	No. 55	Stewart, Duncan M., Millhills, Crieff, " Millhills Marchioness 3rd."
2nd	No. 53	Robertson, Major W. B., M.C., Colton, Dunfermline, " Scotston Bonny Broadhooks."
3rd	No. 54	Smith, R. Laidlaw, Pittodrie, Pitcaple, " Brawith Gem 5th " (137,165).
4th	No. 51	M'William, R. S., Garguston, Muir of Ord, " Garguston Augusta 13th."
V	No. 48	Douglas, George, Cadbollmount, Fearn, Ross-shire, " Mount Rosewood 3rd."
H	No. 52	Piper, James, of The Grange, Burntisland, " Letham Broadhooks 9th."
C	No. 49	Hunter, William C., of Arngask, Glenfarg, " Arngask Beauty 6th."

CLASS 10. HEIFER, born on or after 1st April 1932.—PREMIUMS, £10, £5, £3, and £2.

1st	No. 58	Stewart, Duncan M., Millhills, Crieff, " Cherrywood 4th."
2nd	No. 57	Fletcher, Captain A. M. Talbot, of Saltoun, Saltoun Hall, Pencaitland, " White Crocus."
3rd	No. 56	Fletcher, Captain A. M. Talbot, of Saltoun, Saltoun Hall, Pencaitland, " Saltoun Eliza 2nd."

ABERDEEN-ANGUS.

DUKE OF YORK CHAMPION SILVER MEDAL for best Aberdeen-Angus Animal.

No. 114 Kennedy, Colonel Norman, D.S.O., of Doonholm, Ayr, " Elinka of Doonholm " (87,315).

Reserve—No. 133 Kerr, J. E., of Harviestoun, Dollar, " Erective of Harviestoun " (97,061).

The Angus Perpetual Silver Challenge Cup, value 50 guineas, *for the best Animal in the Aberdeen-Angus Classes, " Extra Stock " eligible to compete.* This Cup has been presented by the Angus Agricultural Association to commemorate the holding of the Society's Annual Show at Dundee.

No. 114 Kennedy, Colonel Norman, D.S.O., of Doonholm, Ayr, " Elinka of Doonholm " (87,315).

Silver Cup, value £50, *for best Group of Aberdeen-Angus Cattle, consisting of one Bull and two Females. "Extra Stock" eligible to compete.* Given by Mr W. Gilchrist Macbeth of Dunira, Comrie.

Nos. 85, 108, 163 Atkinson, Captain F. B., The Home Farm, Gallowhill, Morpeth, Northumberland.

Ballindalloch Challenge Cup, value £50, *for the best Bull of any age in Classes* 11 *to* 14. Given by the late Sir George Macpherson Grant, Bart.

No. 61 Cunningham-Jardine, Mrs D. A. J., Jardine, Lockerbie, "Jujuy" (74,424).

Silver Cup, value 50 guineas, *for best Aberdeen-Angus Bull born on or after* 1st *December* 1930. Given by Senor Eduardo Estanguet, Argentina.

No. 83 Walker, Francis W., of Leys, Leys Castle, Inverness, "Primus of Lethen" (78,679).

Breeder of the best Bull of any age in Classes 11 *to* 14—The Silver Medal.

No. 61 Grant, Captain W. Smith, Minmore, Glenlivet.

Exhibitor of the winner of the Ballindalloch Challenge Cup—The Silver Medal.

No. 61 Cunningham-Jardine, Mrs D. A. J., Jardine, Lockerbie.

Breeder (*if not also the Exhibitor*) *of the winner of the Ballindalloch Challenge Cup*—The Silver Medal.

No. 61 Grant, Captain W. Smith, Minmore, Glenlivet.

CLASS 11. BULL, born before 1st December 1930.—PREMIUMS, £15, £10, £5, and £3.

1st No. 61 Cunningham-Jardine, Mrs D. A. J., Jardine, Lockerbie, "Jujuy" (74,424).
2nd No. 67 Mackay, Charles, of Balnastraid, Carr Bridge, Inverness-shire, "Emerald of Balnastraid" (73,581).
3rd No. 64 Grant, Sir George Macpherson, Bart., Ballindalloch Home Farms, Ballindalloch, "Elmore of Ballindalloch" (73,542).
4th No. 65 Johnston, W. B., Airneyfoul, Glamis, "Hayston Bhamo" (67,686).
V No. 62 Fairlie, Mrs M. C., Kirkton, Monikie, Dundee, "Promotion of Pitcalzean" (68,701).
H No. 66 Macbeth, W. Gilchrist, of Dunira, Comrie, "Erman of Dunira" (70,474).
C No. 73 Walker, Robert W., Portlethen, Aberdeen, "Bugbane" (73,006).

CLASS 12. BULL, born on or after 1st December 1930 and before 1st December 1931.—Premiums, £15, £10, £5, and £3.

1st No. 83 Walker, Francis W., of Leys, Leys Castle, Inverness, " Primus of Lethen " (78,679).
2nd No. 81 Pattullo, J. H., Pitskelly, Carnoustie, " Jerdin Eric " (77,864).
3rd No. 76 Baxendale, Colonel J. F. N., C.B., Froxfield, Petersfield, Hants., " Erman of Amport " (77,197).
4th No. 79 Honeyman, R. Wemyss, Derculich, Strathtay, " Jesset Eric " (77,873).
V No. 80 Macbeth, W. Gilchrist, of Dunira, Comrie, " Prince Peaceful of Minmore " (78,753).
H No. 77 Findlay, Sir Edmund, Bart., Home Farm, Aberlour, " Euxidor 3rd " (77,307).
C No. 84 Whyte, J. & J. L., Hayston, Glamis, " Provost of Candacraig " (78,836).

CLASS 13. BULL, born on or after 1st December 1931 and before 1st March 1932.—Premiums, £12, £8, £4, and £2.

1st No. 85 Atkinson, Captain F. B., The Home Farm, Gallowhill, Morpeth, Northumberland, " Gallowhill Beauty " (80,981).
2nd No. 88 Grant, Robert M'Vitie, Logie Home Farm, Forres, " Gandell " (80,993).
3rd No. 91 Kennedy, Colonel Norman, D.S.O., of Doonholm, Ayr, " Koko of Dunira " (81,477).
4th No. 89 Howison, A. W., Lochbank, Blairgowrie, " Dumas of Hatton " (80,135).
V No. 87 Cochrane, Lieut.-Colonel Lord, of Cults, Crawford Priory, Springfield, Fife, " Eurindo of Bleaton " (80,724).
H No. 86 Brodie, Messrs Lethen, Nairn, " Eclipse of Sandyknowe " (80,235).
C No. 90 Johnston, W. B., Airneyfoul, Glamis, " Prince Vinocle of Airneyfoul " (82,151).

CLASS 14. BULL, born on or after 1st March 1932.—Premiums, £10, £6, £4, and £2.

1st No. 105 Templeton, T. & M., Sandyknowe, Kelso, " Jason Eric " (81,284).
2nd No. 95 Allan, D. M., Ballintomb, Grantown-on-Spey, " Permo of Kinermony " (81,882).
3rd No. 102 Robertson, Charles G., Tullochgribban, Grantown-on-Spey, " Gerdor " (81,051).
4th No. 99 Grant, Sir George Macpherson, Bart., Ballindalloch Home Farms, Ballindalloch, " Elstar of Ballindalloch " (80,437).
V No. 100 Honeyman, R. Wemyss, Derculich, Strathtay, " Pesco of Kinermony " (81,893).
H No. 101 Kerr, J. E., of Harviestoun, Dollar, " Jeffrey Eric " (81,296).
C No. 96 Allan, John M., Easter Duthil, Carr Bridge, " Prince Supreme of Duthil."

Ballindalloch Challenge Cup, value £50, *for the best Cow of any age in Classes* 15 *to* 17. Given by the late Sir John Macpherson Grant, Bart.

No. 115 Beddie, James, Banks, Strichen, " Gammer Debera " (92,534).

Exhibitor of the winner of the Ballindalloch Challenge Cup—The Silver Medal.

No. 115 Beddie, James, Banks, Strichen.

Breeder (if not also the Exhibitor) of the winner of the Ballindalloch Challenge Cup—The Silver Medal.

(Not awarded.)

Silver Cup, value £50, *for the best Female Animal of the Aberdeen-Angus breed, " Extra Stock " eligible to compete.* Given by Mr Falconer L. Wallace of Candacraig, Strathdon.

No. 114 Kennedy, Colonel Norman, D.S.O., of Doonholm, Ayr, " Elinka of Doonholm " (87,315).

Champion Gold Medal, value £10, *for best Animal in the Breeding Classes, breeding animals shown as " Extra Stock " eligible to compete.* Given by the Aberdeen-Angus Cattle Society.

No. 114 Kennedy, Colonel Norman, D.S.O., of Doonholm, Ayr, " Elinka of Doonholm " (87,315).

CLASS 15. COW, in Milk, born before 1st December 1929.—PREMIUMS, £12, £8, £4, and £2.

1st No. 108 Atkinson, Captain F. B., The Home Farm, Gallowhill, Morpeth, Northumberland, " Bond Maid of Banks " (89,279).
2nd No. 110 Marshall & Mitchell, Bleaton, Blairgowrie, " Empress Elegy of Bleaton " (91,063).
3rd No. 113 Walker, Robert W., Portlethen, Aberdeen, " Pride Flora of Coull " (90,736).
4th No. 109 Kennedy, Colonel Norman, D.S.O., of Doonholm, Ayr, " Buddleia of Doonholm " (84,199).
V No. 112 Pattullo, J. H., Pitskelly, Carnoustie, " Ann of Pitskelly " (84,875).
H No. 111 Monro, George, Castle of Fiddes, Stonehaven, " Pearlette 13th of Glenfarclas " (83,923).

EXTRA STOCK.

The following was awarded the Silver Medal:—

No. 114 Kennedy, Colonel Norman, D.S.O., of Doonholm, Ayr, " Elinka of Doonholm " (87,315).

CLASS 16. COW, in Milk, born on or after 1st December 1929 and before 1st December 1930.—PREMIUMS, £12, £8, £4, and £2.

1st No. 115 Beddie, James, Banks, Strichen, "Gammer Debera" (92,534).
2nd No. 117 Reid, Andrew Thomson, of Auchterarder House, Auchterarder, "Primula of Auchterarder" (94,691).
3rd No. 121 Walker, Robert W., Portlethen, Aberdeen, "Portlethen Pride 16th" (95,312).
4th No. 118 Russell, G. H., of The Burn, Glenesk, Brechin, "Bharata of The Burn" (94,880).
V No. 119 Sandeman, F. D. Stewart, The Laws, Kingennie, Angus, "Merula of Inverness" (94,110).
H No. 120 Stewart, The Trustees of the late John, Woodburne, Ceres, Cupar, "Ethe of Woodburne" (95,033).

CLASS 17. COW or HEIFER, born on or after 1st December 1930 and before 1st December 1931.—PREMIUMS, £10, £5, £3, and £2.

1st No. 133 Kerr, J. E., of Harviestoun, Dollar, Heifer, "Erective of Harviestoun" (97,061).
2nd No. 127 Findlay, Sir Edmund, Bart., Home Farm, Aberlour, Heifer, "Euxida 7th" (96,482).
3rd No. 124 Beddie, James, Banks, Strichen, Heifer, "Gammer Evelta" (95,700).
4th No. 132 Kerr, J. E., of Harviestoun, Dollar, Heifer, "Erase of Harviestoun" (97,060).
V No. 129 Grant, Sir George Macpherson, Bart., Ballindalloch Home Farms, Ballindalloch, Heifer, "Elendra of Ballindalloch" (96,678).
H No. 140 Whyte, J. & J. L., Hayston, Glamis, Heifer, "Beauty 177th of Hayston" (98,557).
C No. 130 Howison, A. W., Lochbank, Blairgowrie, Heifer, "Proud Pride of Lochbank" (96,955).
C No. 139 Walker, Robert W., Portlethen, Aberdeen, Heifer, "Edia of Portlethen" (98,431).
C No. 136 Sandeman, F. D. Stewart, The Laws, Kingennie, Angus, Heifer, "Pride of The Laws" (98,057).
C No. 131 Kennedy, Colonel Norman, D.S.O., of Doonholm, Ayr, Heifer, "Muscatel of Doonholm" (97,050).
C No. 138 Strathmore Estates, Glamis, Heifer, "Pink Pearl" (98,207).

CLASS 18. HEIFER, born on or after 1st December 1931 and before 1st March 1932.—PREMIUMS, £10, £5, £3, and £2.

1st No. 147 Findlay, Sir Edmund, Bart., Home Farm, Aberlour, "Juva" (99,321).
2nd No. 146 Findlay, Sir Edmund, Bart., Home Farm, Aberlour, "Everinda" (99,593).
3rd No. 151 Kennedy, Colonel Norman, D.S.O., of Doonholm, Ayr, "Bettine of Doonholm" (100,117).
4th No. 142 Beddie, James, Banks, Strichen, "Romica of Banks" (98,846).
V No. 150 Kennedy, Colonel Norman, D.S.O., of Doonholm, Ayr, "Mead of Doonholm" (100,126).
H No. 148 Grant, Sir George Macpherson, Bart., Ballindalloch Home Farms, Ballindalloch, "Pommame of Ballindalloch" (99,786).
C No. 157 Niven, John, Gloagburn, Tibbermore, Perth, "Exmas Tide" (100,676).
C No. 158 Niven, John, Gloagburn, Tibbermore, Perth, "Pride of Pitfolds 6th" (98,986).

CLASS 19. HEIFER, born on or after 1st March 1932.—PREMIUMS, £10, £5, £3, and £2.

1st	No. 163	Atkinson, Captain F. B., The Home Farm, Gallowhill, Morpeth, Northumberland, " Enchantress of Gallowhill " (98,796).
2nd	No. 168	Kerr, J. E., of Harviestoun, Dollar, " Julie Erica " (100,145).
3rd	No. 171	Russell, G. H., of The Burn, Glenesk, Brechin, " Proud Balgama of The Burn " (101,062).
4th	No. 167	Kennedy, Colonel Norman, D.S.O., of Doonholm, Ayr, " Euphorbia of Doonholm " (100,122).
V	No. 164	Beddie, James, Banks, Strichen, " Gammer Evena " (98,838).
H	No. 170	Reid, Andrew Thomson, of Auchterarder House, Auchterarder, " Bridal of Auchterarder " (100,893).
C	No. 166	Forteviot, Lord, Dupplin Castle, Perth, " Katuna of Nisbethill " (99,511).
C	No. 169	Pattullo, J. H., Pitskelly, Carnoustie, " Lilac of Pitskelly " (100,785).
C	No. 165	Forteviot, Lord, Dupplin Castle, Perth, " Emblem of Dupplin " (99,633).

GALLOWAY.

DUKE OF YORK CHAMPION SILVER MEDAL *for best Galloway Animal.*

No. 172 Black, James, Blair, Maybole, Ayrshire, " Excelsior of Blair " (16,401).

Reserve—No. 186 Buchanan-Jardine, Sir John William, of Castlemilk, Bart., Castle Milk, Lockerbie, " Nazetta 3rd of Castle Milk " (30,930).

Dr Gillespie Memorial Challenge Trophy, value £50, *for best Galloway Animal in the Breeding Classes, breeding animals shown as " Extra Stock " being eligible to compete.* Given by the Galloway Cattle Society of Great Britain and Ireland.

No. 172 Black, James, Blair, Maybole, Ayrshire, " Excelsior of Blair " (16,401).

Silver Challenge Cup, value £50, *for the best Animal of the sex opposite to that of the winner of the Dr Gillespie Memorial Challenge Trophy, " Extra Stock " being eligible to compete.* Given by the Galloway Cattle Society to commemorate the Hundredth Show.

No. 186 Buchanan-Jardine, Sir John William, of Castlemilk, Bart., Castle Milk, Lockerbie, " Nazetta 3rd of Castle Milk " (30,930).

Breeder of best Bull of any age in Classes 20 *to* 22—The Silver Medal.

No. 172 Black, John, Blair, Maybole, Ayrshire.

CLASS 20. BULL, born before 1st December 1930.—PREMIUMS, £15, £10, £5, and £3.

1st	No. 172	Black, James, Blair, Maybole, Ayrshire, "Excelsior of Blair" (16,401).
2nd	No. 173	Carruthers, Lieut.-Colonel F. J., of Dormont, Lockerbie, "War Boy 2nd of Whitehill" (17,463).
3rd	No. 174	Graham, Robert, Chapel of Logan, Canonbie, "Good Gift" (16,186).
4th	No. 175	Hamilton, T., Whiteside, Gatehouse, Kirkcudbrightshire, "Proclamation of Holmendis" (16,826).
V	No. 176	Kennedy-Moffat, W., Auchencheyne, Moniaive, "Radium of Tundergarth Mains" (16,747).

CLASS 21. Bull, born on or after 1st December 1930 and before 1st December 1931.—PREMIUMS, £15, £10, £5, and £3.

1st	No. 177	Graham, Robert, Chapel of Logan, Canonbie, "Barlae Springbok" (18,384).

CLASS 22. BULL, born on or after 1st December 1931.—PREMIUMS, £12, £8, £4, and £2.

1st	No. 179	Biggar, Walter, Grange Farm, Dalbeattie, "Grange Marquis" (18,496).
2nd	No. 180	Gourlay, Francis N. M., Kirkland, Tynron, Dumfriesshire, "Emilius of Kirkland" (18,631).
3rd	No. 178	Anderson, James Keith, Kirtleton, Waterbeck, Lockerbie, "Culmark Conjuror" (18,592).
4th	No. 181	Graham, Robert, Chapel of Logan, Canonbie, "Darius of Blawquhairn" (18,814).
V	No. 183	Wilson, James, & Son, Tundergarth Mains, Lockerbie, "Barmark Challenger" (18,590).

CLASS 23. COW, in Milk, born before 1st December 1930.—PREMIUMS, £12, £8, £4, and £2.

1st	No. 186	Buchanan-Jardine, Sir John William, of Castlemilk, Bart., Castle Milk, Lockerbie, "Nazetta 3rd of Castle Milk" (30,930).
2nd	No. 189	Duncan, Arthur B., Gilchristland, Closeburn, Dumfries, "Elsie of Scroggiehall" (31,783).
3rd	No. 185	Buchanan-Jardine, Sir John William, of Castlemilk, Bart., Castle Milk, Lockerbie, "Lady Constance 2nd of Castle Milk" (30,925).
4th	No. 188	Duncan, Arthur B., Gilchristland, Closeburn, Dumfries, "Ewanston Fashion" (31,417).
V	No. 193	Wilson, James, & Son, Tundergarth Mains, Lockerbie, "Lady Alice 7th of Tundergarth Mains" (30,589).
H	No. 192	Paterson, R. Jardine, of Balgray, Lockerbie, "Melba 3rd of Balgray" (33,746).
C	No. 190	Graham, C. E., Bogrie, Canonbie, "Lady Mabel of Barnsoul" (29,731).
C	No. 191	Paterson, R. Jardine, of Balgray, Lockerbie, "Frisky 3rd of Balgray" (33,735).

CLASS 24. COW or HEIFER, born on or after 1st December 1930 and before 1st December 1931.—PREMIUMS, £10, £5, £3, and £2.

1st No. 200 Graham, Robert, Chapel of Logan, Canonbie, Heifer, "Logan Lady 31st" (34,415).
2nd No. 195 Buccleuch Estates, Limited, Drumlanrig, Thornhill, Dumfriesshire, Heifer, "Nonsense of Drumlanrig" (34,166).
3rd No. 198 Carruthers, Lieut.-Colonel F. J., of Dormont, Lockerbie, Heifer, "Nettie of Dormont" (34,205).
4th No. 199 Carruthers, Lieut.-Colonel F. J., of Dormont, Lockerbie, Heifer, "Naomi of Dormont" (34,207).
V No. 196 Buchanan-Jardine, Sir John William, of Castlemilk, Bart., Castle Milk, Lockerbie, Heifer, "Sweet Pea 3rd of Castle Milk" (34,468).
H No. 205 Wilson, James, & Son, Tundergarth Mains, Lockerbie, Heifer, "Deborah 3rd of Tundergarth Mains" (34,864).
C No. 206 Wilson, James, & Son, Tundergarth Mains, Lockerbie, Heifer, "Nancy 57th of Tundergarth Mains" (34,869).
C No. 201 Graham, Robert, Chapel of Logan, Canonbie, Heifer, "Logan Lady 32nd" (34,417).

CLASS 25. HEIFER, born on or after 1st December 1931.—PREMIUMS, £10, £5, £3, and £2.

1st No. 216 Graham, Robert, Chapel of Logan, Canonbie, "Logan Lady 34th" (35,142).
2nd No. 209 Biggar, Walter, Grange Farm, Dalbeattie, "Grange Maggie 20th" (34,907).
3rd No. 215 Graham, C. E., Bogrie, Canonbie, "May Queen 12th of Logan" (35,143).
4th No. 211 Buccleuch Estates, Limited, Drumlanrig, Thornhill, Dumfriesshire, "Petunia of Drumlanrig" (34,931).
V No. 208 Biggar, Walter, Grange Farm, Dalbeattie, "Grange Lizzie 31st" (34,905).
H No. 218 Kennedy-Moffat, W., Auchencheyne, Moniaive, "Betty of Lochurr" (35,217).
C No. 210 Buccleuch Estates, Limited, Drumlanrig, Thornhill, Dumfriesshire, "Polonaise of Drumlanrig" (34,930).
C No. 213 Gourlay, Francis N. M., Kirkland, Tynron, Dumfriesshire, "Rose Leaf 3rd of Kirkland" (35,130).

BELTED GALLOWAY.

DUKE OF YORK CHAMPION SILVER MEDAL for best Belted Galloway Animal.

No. 223 Barton, Captain P. G., of Auchenskeoch, Dalbeattie, "Gartmore Benet" (901 B).

Reserve—No. 239 Sproat, J. Faed, Boreland of Anwoth, Gatehouse, Galloway, "Mochrum Cissie of Craigeach" (3014 B).

Knockbrex Challenge Cup, value £50, *for the best Belted Galloway Animal, "Extra Stock" being eligible to compete.* This Cup was presented by Mrs Brown, Kirkbrex, Glasgow, for the best Belted Galloway animal registered in the Dun and Belted Galloway Cattle Breeders' Association Herd-Book, entered in any of the breeding classes, at the Show at which it may be competed for.

No. 223 Barton, Captain P. G., of Auchenskeoch, Dalbeattie, "Gartmore Benet" (901 B).

The Ian Hamilton Silver Challenge Cup, value £50, *for the best Belted Galloway Animal of the sex opposite to that of the winner of the Knockbrex Challenge Cup, "Extra Stock" eligible to compete.* This Cup has been presented by General Sir Ian Hamilton, G.C.B.

No. 239 Sproat, J. Faed, Boreland of Anwoth, Gatehouse, Galloway, "Mochrum Cissie of Craigeach" (3014 B).

CLASS 26. BULL, born before 1st December 1931.—PREMIUMS, £10, £5, £3, and £2.

1st No. 223 Barton, Captain P. G., of Auchenskeoch, Dalbeattie, "Gartmore Benet" (901 B).
2nd No. 224 Bell-Irving, J. J., Makerstoun, Kelso, "Mark Haig" (969 B).
3rd No. 226 Sproat, J. Faed, Boreland of Anwoth, Gatehouse, Galloway, "Gartmore Charles" (701 B).
4th No. 225 Hamilton, General Sir Ian, G.C.B., 1 Hyde Park Gardens, London, "Knockbrex Heron" (955 B).

EXTRA STOCK.

The following was awarded the Silver Medal:—

No. 227 Nalc Company, Limited (per Sir August Cayzer, Bart.), Estates Office, Gartmore, Stirling, "Gartmore Robin" (707 B).

CLASS 27. BULL, born on or after 1st December 1931.—PREMIUMS, £10, £5, £3, and £2.

1st No. 231 Nalc Company, Limited (per Sir August Cayzer, Bart.), Estates Office, Gartmore, Stirling, "Gartmore Basil" (1031 B).
2nd No. 230 Nalc Company, Limited (per Sir August Cayzer, Bart.), Estates Office, Gartmore, Stirling, "Gartmore Peter" (1033 B).
3rd No. 228 Graham, A., Auchengassel, Twynholm, "Mochrum Pioneer" (1037 B).
4th No. 229 Miller, John R., Midkelton, Castle Douglas, "Gartmore Edmund" (1029 B).

CLASS 28. COW or HEIFER, born before 1st December 1930, in Milk or in Calf; if in calf and not in milk, to calve on or before 1st December of the year of the Show.—PREMIUMS, £10, £5, £3, and £2.

1st No. 232 Bell-Irving, J. J., Makerstoun, Kelso, Cow, "Makerstoun Meg" (648 B).
2nd No. 236 Nalc Company, Limited (per Sir August Cayzer, Bart.), Estates Office, Gartmore, Stirling, Cow, "Gartmore Helen I." (1322 B).
3rd No. 233 Hamilton, General Sir Ian, G.C.B., 1 Hyde Park Gardens, London, Cow, "Gartmore Lily II." (1326 B).
4th No. 234 Hamilton, General Sir Ian, G.C.B., 1 Hyde Park Gardens, London, Cow, "Shenley Barbara" (1682 B).

CLASS 29. HEIFER, born on or after 1st December 1930 and before 1st December 1931.—PREMIUMS, £10, £5, £3, and £2.

1st No. 239 Sproat, J. Faed, Boreland of Anwoth, Gatehouse, Galloway, "Mochrum Cissie of Craigeach" (3014 B).
2nd No. 237 Hamilton, General Sir Ian, G.C.B., 1 Hyde Park Gardens, London, "Lullenden Poppy" (3124 B).
3rd No. 238 Nalc Company, Limited (per Sir August Cayzer, Bart.), Estates Office, Gartmore, Stirling, "Gartmore Nell I." (2258 B).

CLASS 30. HEIFER, born on or after 1st December 1931.—PREMIUMS, £10, £5, £3, and £2.

1st No. 242 Nalc Company, Limited (per Sir August Cayzer, Bart.), Estates Office, Gartmore, Stirling, "Gartmore Edith I." (3058 B).
2nd No. 241 Hamilton, General Sir Ian, G.C.B., 1 Hyde Park Gardens, London, "Lullenden Bess" (3106 B).
3rd No. 243 Nalc Company, Limited (per Sir August Cayzer, Bart.), Estates Office, Gartmore, Stirling, "Gartmore Millicent I." (3074 B).
4th No. 240 Hamilton, General Sir Ian, G.C.B., 1 Hyde Park Gardens, London, "Lullenden Lily II." (3120 B).

HIGHLAND.

DUKE OF YORK CHAMPION SILVER MEDAL for best Highland Animal.

No. 280 Nelson, Thomas E., of Achnacloich, Connel, Argyll, "Sweetheart of Achnacloich" (10,392).

Reserve—No. 247 Lees-Milne, Mrs, of Killundine, Drimnin, Argyll, "An Bàidheach of Killundine" (3657).

Perpetual Victory Challenge Cup, approximate value 50 guineas, *for the best Animal in the Male Classes, "Extra Stock" being eligible to compete.* Given by the Highland Cattle Society of Scotland.

No. 247 Lees-Milne, Mrs, of Killundine, Drimnin, Argyll, "An Bàidheach of Killundine" (3657).

Breeder of best Bull in Classes 31 *to* 33—The Silver Medal.

No. 247 Lees-Milne, the late A. M., Knock, Cruline, Isle of Mull.

CLASS 31. Bull, born before 1931.—PREMIUMS, £15, £10, £5, and £3.

1st No. 246 Southesk, The Earl of, Kinnaird Castle, Brechin, "Carrington VII." (3687).
2nd No. 245 Nelson, Thomas E., of Achnacloich, Connel, Argyll, "Ossian V. of Southesk" (3566).
3rd No. 244 M'Douall, A. Kenneth, of Logan, Port Logan, Stranraer, "Prionnsa Buidhe of Kilchamaig" (3581).

CLASS 32. BULL, born in 1931. PREMIUMS, £15, £10, £5, and £3.

1st	No. 247	Lees-Milne, Mrs, of Killundine, Drimnin, Argyll, "An Bàidheach of Killundine" (3657).
2nd	No. 250	Walker, Francis W., of Leys, Leys Castle, Inverness, "Duke II. of Flichity" (3651).
3rd	No. 249	Nelson, Thomas E., of Achnacloich, Connel, Argyll, "Ossian of Achnacloich" (3672).
4th	No. 248	M'Douall, A. Kenneth, of Logan, Port Logan, Stranraer, "Albannach of Logan."

CLASS 33. BULL, born in 1932.—PREMIUMS, £12, £8, £4, and £2.

1st	No. 253	Lees-Milne, Mrs, of Killundine, Drimnin, Argyll, "Spaideil Ruadh of Killundine" (3708).
2nd	No. 258	Nelson, Thomas E., of Achnacloich, Connel, Argyll, "Culnadalloch V. of Achnacloich" (3706).
3rd	No. 251	Dunlop, Miss, of Shieldhill, Biggar, "An Gille Buidhe of Quothquan" (3730).
4th	No. 257	Morrison, John G., of Islay, Islay House, Bridgend, Islay, Argyll, "Ossian Ile."
V	No. 259	Walker, Francis W., of Leys, Leys Castle, Inverness, "Domhnull of Leys" (3731).
H	No. 255	M'Douall, A. Kenneth, of Logan, Port Logan, Stranraer, "Ruairidh Ruadh of Logan" (3726).
C	No. 256	Maitland, Brig.-General J. D. Heriot, C.M.G., D.S.O., of Errol, Errol Park, Errol, "Coruisk of Errol."

Perpetual Victory Challenge Cup, approximate value 35 guineas, *for the best Animal in the Female Classes, "Extra Stock" being eligible to compete.* Given by the Highland Cattle Society of Scotland.

No. 280	Nelson, Thomas E., of Achnacloich, Connel, Argyll, "Sweetheart of Achnacloich" (10,392).

CLASS 34. COW, of any age, with Calf at foot.—
PREMIUMS, £12, £8, £4, and £2.

1st	No. 264	Nelson, Thomas E., of Achnacloich, Connel, Argyll, "Capleadh IX. of Achnacloich" (10,150).
2nd	No. 260	Dunlop, Miss, of Shieldhill, Biggar, "Princess Geralda VI." (10,182).
3rd	No. 261	Dunlop, Miss, of Shieldhill, Biggar, "Maireared VI. of Achnacloich" (10,390).
4th	No. 262	Lees-Milne, Mrs, of Killundine, Drimnin, Argyll, "Baravalla Smiorail V." (9904).
V	No. 265	Southesk, The Earl of, Kinnaird Castle, Brechin, "Sheila II." (10,512).
H	No. 263	Maitland, Brig.-General J. D. Heriot, C.M.G., D.S.O., of Errol, Errol Park, Errol, "Shuna V. of Errol" (10,267).

CLASS 35. HEIFER, born in 1930.—PREMIUMS, £10, £5, £3, and £2.

1st	No. 268	Lees-Milne, Mrs, of Killundine, Drimnin, Argyll, " Una Bhuidhe II. of Knock " (10,379).
2nd	No. 273	Southesk, The Earl of, Kinnaird Castle, Brechin, " Madam Corrina " (10,507).
3rd	No. 272	Nelson, Thomas E., of Achnacloich, Connel, Argyll, " Capleadh XIII. of Achnacloich " (10,602).
4th	No. 267	Dalgleish, James P., of Westgrange, Newmills, Dunfermline, " Maighdean Ruadh of Kilchamaig " (10,575).
V	No. 270	Maitland, Brig.-General J. D. Heriot, C.M.G., D.S.O., of Errol, Errol Park, Errol, " Sheila III. of Errol " (10,375).
H	No. 271	Maitland, Brig.-General J. D. Heriot, C.M.G., D.S.O., of Errol, Errol Park, Errol, " Fuinary Princess III. of Errol " (10,376).
C	No. 266	Carnegie, Mrs, of Stronvar, Balquhidder, Strathyre, Perthshire, " Princess Alma XIII. of Stronvar " (10,385).

CLASS 36. HEIFER, born in 1931.—PREMIUMS, £10, £5, £3, and £2.

1st	No. 280	Nelson, Thomas E., of Achnacloich, Connel, Argyll, " Sweetheart of Achnacloich " (10,392).
2nd	No. 279	Morrison, John G., of Islay, Islay House, Bridgend, Islay, Argyll, " Bean Bhan Ile II." (10,546).
3rd	No. 277	Maitland, Brig.-General J. D. Heriot, C.M.G., D.S.O., of Errol, Errol Park, Errol, " Sheila IV. of Errol " (10,536).
4th	No. 281	Nelson, Thomas E., of Achnacloich, Connel, Argyll, "Cuailean XVIII. of Achnacloich " (10,604).
V	No. 278	Morrison, John G., of Islay, Islay House, Bridgend, Islay, Argyll, " Cuailean Ile " (10,547).
H	No. 276	Maitland, Brig.-General J. D. Heriot, C.M.G., D.S.O., of Errol, Errol Park, Errol, " Fiona Maid of Errol " (10,538).
C	No. 274	Carnegie, Mrs, of Stronvar, Balquhidder, Strathyre, Perthshire, " Princess Alma XVI. of Stronvar " (10,583).
C	No. 275	Lees-Milne, Mrs, of Killundine, Drimnin, Argyll, " Una Bhuidhe III. of Killundine " (10,586).

CLASS 37. HEIFER, born in 1932.—PREMIUMS, £10, £5, £3, and £2.

1st	No. 286	Maitland, Brig.-General J. D. Heriot, C.M.G., D.S.O., of Errol, Errol Park, Errol, " Lydia Queen II. of Errol."
2nd	No. 288	Nelson, Thomas E., of Achnacloich, Connel, Argyll, " Capleadh XIV. of Achnacloich " (10,601).
3rd	No. 284	Lees-Milne, Mrs, of Killundine, Drimnin, Argyll, " Mhollach Ruadh III. of Killundine " (10,578).
4th	No. 289	Southesk, The Earl of, Kinnaird Castle, Brechin, " Lady Mairi II."
V	No. 282	Lees-Milne, Mrs, of Killundine, Drimnin, Argyll, " Donnag Riabhach of Killundine " (10,579).
H	No. 287	Nelson, Thomas E., of Achnacloich, Connel, Argyll, " Mairi IX. of Achnacloich " (10,600).
C	No. 285	Maitland, Brig.-General J. D. Heriot, C.M.G., D.S.O., of Errol, Errol Park, Errol, " Sheila V. of Errol."
C	No. 290	Southesk, The Earl of, Kinnaird Castle, Brechin, " Corrina III. of Southesk."

AYRSHIRE.

DUKE OF YORK CHAMPION SILVER MEDAL for best Ayrshire Animal.

No. 303 M'Alister, James, Meikle Kilmory, Rothesay, " Meikle Kilmory Rosary " (91,252).

Reserve—No. 350 Montgomerie, Adam W., of Lessnessock, Ochiltree, " Bargenoch Blue Ribbon " (31,923).

Dundee Citizens' Perpetual Silver Challenge Cup, value about £50, *for the best Animal in the Ayrshire Classes, " Extra Stock " eligible to compete.* This Cup has been presented by the Citizens of Dundee to commemorate the holding of the Society's Annual Show at Dundee.

No. 303 M'Alister, James, Meikle Kilmory, Rothesay, " Meikle Kilmory Rosary " (91,252).

Cowhill Champion Cup, approximate value £30, *for best Animal of the Ayrshire breed, entered with a number in the Herd-Book.* Presented by the late Major Henry Keswick, Cowhill Tower, Dumfries, to the Ayrshire Cattle Herd-Book Society, to be competed for annually at the Shows of the Highland and Agricultural Society of Scotland.

No. 350 Montgomerie, Adam W., of Lessnessock, Ochiltree, " Bargenoch Blue Ribbon " (31,923).

Special Prize of £10 *for the best Female Animal of the Ayrshire breed entered with a number in the Ayrshire Cattle Herd-Book prior to 1st June* 1933. Given by the Ayrshire Cattle Herd-Book Society.

No. 303 M'Alister, James, Meikle Kilmory, Rothesay, " Meikle Kilmory Rosary " (91,252).

CLASS 38. COW, in Milk, born before 1930.—PREMIUMS, £12, £8, and £4.

1st No. 301 Montgomerie, Adam W., of Lessnessock, Ochiltree, " Cauldhame Moss 2nd " (21,253).
2nd No. 302 Turner, James, Loaninghead, Balfron Station, " Loaninghead Lady " (B 6794).
3rd No. 294 Cross, Robert, of Knockdon, Maybole, " Knockdon Beautiful " (2068).
V No. 296 Cross, Robert, of Knockdon, Maybole, " Knockdon Derby Girl " (24,406).
H No. 300 Mackay, Robert, Bruchag, Rothesay, " Ballochmartin Lady Alice 3rd " (16,167).
C No. 291 Butter, Colonel C. A. J., Cluniemore Home Farm, Pitlochry, " Cluniemore Amber " (22,068).

EXTRA STOCK.

The following was awarded the Silver Medal:—

No. 303 M'Alister, James, Meikle Kilmory, Rothesay, " Meikle Kilmory Rosary " (91,252).

CLASS 39. COW, in Milk, born on or after 1st January 1930.—PREMIUMS, £10, £7, and £3.

1st	No. 304	Ardgowan Estates Limited, Ardgowan, Inverkip, "Ardgowan Griselda" (35,470).
2nd	No. 307	Clark, John, Dunrod Farm, Inverkip, "Dunrod Mist 3rd" (33,178).
3rd	No. 311	M'Alister, James, Meikle Kilmory, Rothesay, "Meikle Kilmory Rosebud" (30,073).
V	No. 310	Howie, James, & Sons, Muirside, Dumfries, "Howie's Gowan" (29,830).

CLASS 40. COW, of any age, in Calf, and due to calve before 1st December of the year of the Show.—PREMIUMS, £10, £7, and £3.

1st	No. 318	Turner, James, Loaninghead, Balfron Station, "Loaninghead May" (27,611).
2nd	No. 316	M'Alister, James, Meikle Kilmory, Rothesay, "Meikle Kilmory Lady Jean" (16,942).
3rd	No. 313	Billyard-Leake, Commander E. W., Hollybush, Ayr, "Dalgig Eva" (13,545).
V	No. 319	Wemyss, Lady Victoria, Wemyss Castle Home Farm, Wemyss Castle, East Wemyss, Fife, "Dalfibble Dairy Lass" (2427).
H	No. 317	Rowallan, Lord, M.C., Rowallan, Kilmarnock, "Rowallan Tilda 5th" (8582).

CLASS 41. HEIFER, born on or after 1st June 1930, in Calf, and due to calve before 1st December of the year of the Show.—PREMIUMS, £10, £7, and £3.

1st	No. 324	Clark, John, Dunrod Farm, Inverkip, "Dunrod Honeysuckle 2nd" (36,852).
2nd	No. 327	Ferguson, William L., East Cairnweil, Stranraer, "Cairnweil Pearl" (31,309).
3rd	No. 329	Johnstone, John, Millantae, Lockerbie, "Millantae Gipsy Queen" (41,480).
V	No. 326	Dunlop, Quintin, Greenan, Ayr, "Greenan Madge 4th" (38,212).
H	No. 321	Ardgowan Estates Limited, Ardgowan, Inverkip, "Ardgowan Gavotte" (35,461).
C	No. 325	Corporation of Dundee, Gourdie Farm, Dundee, "Drumaston Robina 2nd" (42,118).
C	No. 328	Howie, James, & Sons, Muirside, Dumfries, "Howie's Iris" (41,047).
C	No. 331	Montgomerie, Adam W., of Lessnessock, Ochiltree, "Drongan Mains Rosabelle" (39,895).

CLASS 42. HEIFER, born in 1931.—PREMIUMS, £10, £5, and £3.

1st	No. 337	Montgomerie, Adam W., of Lessnessock, Ochiltree, "Lessnessock Clover 2nd" (35,175).
2nd	No. 335	Ardgowan Estates Limited, Ardgowan, Inverkip, "Ardgowan Grata."
3rd	No. 336	Howie, James, & Sons, Muirside, Dumfries, "Howie's Blossom 7th" (44,125).
V	No. 338	Rottenburg, F. A., of Lochlane, Crieff, "Lochlane Jenty" (43,892).

CLASS 43. HEIFER, born in 1932.—PREMIUMS, £8, £5, and £3.

1st No. 339 Barr, Thomas, Hobsland, Monkton, "**Hobsland Nancy 27th**" (43,017).
2nd No. 342 Cochrane, Lieut.-Colonel Lord, of Cults, Crawford Priory, Springfield, Fife, "Cults Cleopatra."
3rd No. 345 Gilliland, James, Grassmillees, Mauchline, "Grassmillees Poppy."
V No. 344 Dunlop, Quintin, Greenan, Ayr, "Greenan Adela 2nd" (45,459).
H No. 341 Buchanan, Andrew, Burnside of Balhaldie, Braco, Dunblane, "Westerton Queenie 3rd."
C No. 340 Barr, Thomas, Hobsland, Monkton, "Hobsland Lily 16th" (43,013).

Breeder of best Bull of any age in Classes 44 *to* 46—The Silver Medal.

No. 350 Logan, John, Bargenoch, Drongan.

Special Prize of £10 *for the best Male Animal of the Ayrshire breed entered with a number in the Ayrshire Cattle Herd-Book prior to 1st June* 1933. Given by the Ayrshire Cattle Herd-Book Society.

No. 350 Montgomerie, Adam W., of Lessnessock, Ochiltree, "Bargenoch Blue Ribbon" (31,923).

CLASS 44. BULL, born before 1931.—PREMIUMS, £12, £8, and £4.

1st No. 350 Montgomerie, Adam W., of Lessnessock, Ochiltree, "Bargenoch Blue Ribbon" (31,923).
2nd No. 349 Lawrie, Arthur, Kessington Farm, Bearsden, "Dalpeddar Ginger Snap" (30,615).
3rd No. 348 Cochrane, Lieut.-Colonel Lord, of Cults, Crawford Priory, Springfield, Fife, "Cults Douglas" (30,047).
V No. 351 Stair, The Earl of, D.S.O., Lochinch, Stranraer, "Low Balcray High Degree" (29,278).

CLASS 45. BULL, born in 1931.—PREMIUMS, £10, £7, and £3.

1st No. 355 Murdoch, David, Crofthead, Ochiltree, "Westburn Stamp" (32,560).
2nd No. 352 Buchanan, Andrew, Burnside of Balhaldie, Braco, Dunblane, "Cults Magog" (31,069).
3rd No. 353 Howie, James, & Sons, Muirside, Dumfries, "Hobsland Invincible" (30,980).

CLASS 46. BULL, born in 1932.—PREMIUMS, £8, £5, and £3.

1st No. 358 Howie, James, & Sons, Muirside, Dumfries, "Eastertown Classic" (32,386).
2nd No. 360 Wallace, William, Lyonston, Maybole, "Lyonston Challenge" (32,473).
3rd No. 359 Rowallan, Lord, M.C., Rowallan, Kilmarnock, "Rowallan Salesman" (32,081).

BRITISH FRIESIAN.

DUKE OF YORK CHAMPION SILVER MEDAL for best British Friesian Animal.

No. 407 Pathhead & Sinclairtown Reform Co-operative Society, Limited, 102 Commercial Street, Kirkcaldy, " Branchal Ver Klaske " (32,343).

Reserve—No. 367 Christison, John, Crossveggate, Milngavie, " Findlay Fluky " (71,214).

The MacRobert Champion Silver Bell, value 50 Guineas, *for the best Animal in the British Friesian Classes registered in or eligible for entry in the British Friesian Cattle Society's Herd-Book, " Extra Stock " eligible to compete.* Given by Lady Rachel Workman MacRobert, Douneside, Tarland.

No. 407 Pathhead & Sinclairtown Reform Co-operative Society, Limited, 102 Commercial Street, Kirkcaldy, " Branchal Ver Klaske " (32,343).

Silver Challenge Cup, value 50 Guineas, *for the best Group of three animals, " Extra Stock " eligible to compete.* Given by the British Friesian Cattle Society.

Nos. 383, 384, 394 MacRobert, Trustees of Sir Alasdair W., Bart., Douneside Home Farm, Tarland, Aboyne.

Champion Prize of £5 given by the British Friesian Cattle Society *for the best Female exhibited.*

No. 367 Christison, John, Crossveggate, Milngavie, " Findlay Fluky " (71,214).

CLASS 47. COW, in Milk, born in or before 1929.—PREMIUMS, £12, £8, £4, and £2.

1st No. 363 Glentanar, Lord, Glen Tanar, Aboyne, " Glentanar Barelectra " (137,052).
2nd No. 364 M'Ilchere, Malcolm, Cartside Farm, Thorntonhall, " Bronville Polly Elma " (124,342).
3rd No. 361 Craig, John, Green Farm, Linwood, Paisley, " Cart Ideal " (134,628 R.M.).

CLASS 48. COW, in Calf, and not in Milk, born in or before 1929.—PREMIUMS, £10, £5, £3, and £2.

1st No. 367 Christison, John, Crossveggate, Milngavie, " Findlay Fluky " (71,214).
2nd No. 368 Easson, George, Sheephousewell Farm, Dunfermline, " Sheephousewell Stella " (121,100).
3rd No. 369 Gardner, William, Springfield, Linlithgow, " Beechwood Keepsake " (112,790).
4th No. 370 Glentanar, Lord, Glen Tanar, Aboyne, " Bartonlecley Ena " (78,640).
V No. 372 Spence, Andrew, Commieston, Montrose, " Commieston Getysia " (125,260).
C No. 371 Macaulay, Andrew, Lathalmond Farm, Dunfermline, " Lathalmond Conniemijn " (95,526).

CLASS 49. COW, in Milk, born in 1930 or 1931.—PREMIUMS, £10, £5, £3, and £2.

1st	No. 375	Glentanar, Lord, Glen Tanar, Aboyne, "Glentanar Barmaid" (146,932).
2nd	No. 377	Spence, Andrew, Commieston, Montrose, "Commieston Inola Montez" (145,166).
3rd	No. 374	Craig, John, Green Farm, Linwood, Paisley, "Cart Joy" (144,544).
4th	No. 376	MacRobert, Trustees of Sir Alasdair W., Bart., Douneside Home Farm, Tarland, Aboyne, "Douneside May" (145,920).

CLASS 50. HEIFER, born in 1931—PREMIUMS, £10, £5, £3, and £2.

1st	No. 383	MacRobert, Trustees of Sir Alasdair W., Bart., Douneside Home Farm, Tarland, Aboyne, "Douneside Lala 2nd" (155,742).
2nd	No. 384	MacRobert, Trustees of Sir Alasdair W., Bart., Douneside Home Farm, Tarland, Aboyne, "Douneside Bertus Minna 4th" (155,736).
3rd	No. 382	M'Nair, Samuel, Merrymouth Farm, Dunlop, "Moy Alma" (159,578).
4th	No. 378	Craig, John, Green Farm, Linwood, Paisley, "Cart Kiola" (154,384).
V	No. 387	Spence, Andrew, Commieston, Montrose, "Commieston Jagirl" (154,904).
H	No. 386	Pathhead & Sinclairtown Reform Co-operative Society, Limited, 102 Commercial Street, Kirkcaldy, "Abden Laurel" (152,742).
C	No. 380	Glentanar, Lord, Glen Tanar, Aboyne, "Glentanar Balaurie" (156,766).
C	No. 385	Melville, L. & A. C., Northbank, Errol, Perthshire, "Gowrie Yeltze" (156,946).

CLASS 51. HEIFER, born in 1932 before 1st July.—PREMIUMS, £10, £5, £3, and £2.

1st	No. 394	MacRobert, Trustees of Sir Alasdair W., Bart., Douneside Home Farm, Tarland, Aboyne, "Douneside Lala 3rd" (166,458).
2nd	No. 396	Spence, Andrew, Commieston, Montrose, "Commieston Korth 2nd" (165,582).
3rd	No. 388	Christison, John, Crossveggate, Milngavie, "Crossveggate Pel Empress Akke" (165,946).
4th	No. 390	Glentanar, Lord, Glen Tanar, Aboyne, "Glentanar Joulectra" (167,532).
V	No. 397	Spence, Andrew, Commieston, Montrose, "Commieston Kola Montez" (165,578).
H	No. 389	Craig, John, Green Farm, Linwood, Paisley, "Cart Lala" (164,876).
C	No. 392	Kilpatrick, James, Craigie Mains, Kilmarnock, "Craigiemains Lady Betty 2nd" (165,790).

CLASS 52. HEIFER, born in 1932 on or after 1st July.—PREMIUMS, £10, £5, £3, and £2.

1st No. 402 MacRobert, Trustees of Sir Alasdair W., Bart., Douneside Home Farm, Tarland, Aboyne, "Douneside Sheila 2nd" (166,478).
2nd No. 399 Glentanar, Lord, Glen Tanar, Aboyne, "Glentanar Grethika" (167,530 P.I.).
3rd No. 400 Kilpatrick, James, Craigie Mains, Kilmarnock, "Craigiemains Lady Bounty 2nd" (165,792).
4th No. 401 Macaulay, Andrew, Lathalmond Farm, Dunfermline, "Lathalmond Sunny" (169,176).
V No. 398 Christison, John, Crossveggate, Milngavie, "Crossveggate Pel Daisy" (165,944).
H No. 403 Spence, Andrew, Commieston, Montrose, "Commieston Kaadysia" (165,550).

Breeder of best Bull of any age in Classes 53 *to* 55—The Silver Medal.

No. 407 Telfer, John, Branchal, Kilmacolm.

Champion Prize of £5 given by the British Friesian Cattle Society *for the best Male exhibited.*

No. 407 Pathhead & Sinclairtown Reform Co-operative Society, Limited, 102 Commercial Street, Kirkcaldy, "Branchal Ver Klaske" (32,343).

CLASS 53. BULL, born in or before 1930.—PREMIUMS, £12, £8, £4, and £2.

1st No. 407 Pathhead & Sinclairtown Reform Co-operative Society, Limited, 102 Commercial Street, Kirkcaldy, "Branchal Ver Klaske" (32,343).
2nd No. 406 MacRobert, Trustees of Sir Alasdair W., Bart., Douneside Home Farm, Tarland, Aboyne, "Douneside Bishop" (37,255).
3rd No. 405 Kirkpatrick, Francis N., Loch House, Beattock, "Glentanar Barion" (35,795).
4th No. 404 Glentanar, Lord, Glen Tanar, Aboyne, "Hales Burika" (35,865 P.I.).
V No. 408 Prentice, John W., Craigrie Farm, Clackmannan, "Auchengool Tarzan" (33,723).

EXTRA STOCK.

The following was awarded the Silver Medal:—

No. 409 M'Ilchere, Malcolm, Cartside Farm, Thorntonhill, "Kintyre Thorn" (36,047).

CLASS 54. BULL, born in 1931.—PREMIUMS, £10, £5, £3, and £2.

1st No. 410 MacRobert, Trustees of Sir Alasdair W., Bart., Douneside Home Farm, Tarland, Aboyne, "Dennistoun Jeringa" (38,811 P.I.).

CLASS 55. BULL, born in 1932.—PREMIUMS, £10, £5, £3, and £2.

1st No. 412 Glentanar, Lord, Glen Tanar, Aboyne, " Glentanar Barjen " (40,523).
2nd No. 416 MacRobert, Trustees of Sir Alasdair W., Bart., Douneside Home Farm, Tarland, Aboyne, " Douneside Benefactor 4th " (40,377).
3rd No. 415 MacRobert, Trustees of Sir Alasdair W., Bart., Douneside Home Farm, Tarland, Aboyne," Douneside Mastertouch " (40,393).
4th No. 413 Kilpatrick, James, Craigie Mains, Kilmarnock, " Craigiemains Lord Inkerman " (40,265).
V No. 419 Spence, Andrew, Commieston, Montrose, " Commieston Kisold " (40,239).
H No. 417 Pathhead & Sinclairtown Reform Co-operative Society, Limited, 102 Commercial Street, Kirkcaldy, " Tantallon Bassarikus " (41,291).

RED POLL.

CLASS 56.
CLASS 57.
CLASS 58. Cancelled owing to insufficient entries.
CLASS 59.
CLASS 60.

FAT CATTLE.

DUKE OF YORK CHAMPION SILVER MEDAL
for best Fat Animal.

No. 439 Gourlay, Francis N. M., Kirkland, Tynron, Dumfriesshire (Galloway), " Favourite 5th of Kirkland " (34,404).

Reserve—No. 424 Sandeman, F. D. Stewart, The Laws, Kingennie, Angus (Aberdeen-Angus), " Easordach " (76,750).

CLASS 61. BULLOCK, any pure breed or cross, born on or after 1st December 1930 and before 1st December 1931.—PREMIUMS, £7 and £3.

1st No. 424 Sandeman, F. D. Stewart, The Laws, Kingennie, Angus (Aberdeen-Angus), " Easordach " (76,750).
2nd No. 421 Booth, James D., Dens, Peterhead (Aberdeen-Angus Bull—Cross-bred Cow), " Jimmie of Dens."
V No. 425 Sandeman, F. D. Stewart, The Laws, Kingennie, Angus (Aberdeen-Angus Bull—Aberdeen-Angus Cross Cow), " Archie."
H No. 422 Booth, James D., Dens, Peterhead (Aberdeen-Angus Bull—Cross-bred Cow), " Blue Bill of Dens."
C No. 420 Black, J. Belfrage, Tillywhaly, Milnathort (Aberdeen-Angus Bull—Aberdeen-Angus Cross Cow), " Mick."
C No. 423 Sandeman, F. D. Stewart, The Laws, Kingennie, Angus (Aberdeen-Angus Bull—Cross-bred Cow), " Charles."

CLASS 62. BULLOCK, any pure breed or cross, born on or after 1st December 1931.—PREMIUMS, £7 and £3.

1st No. 433 Reid, Andrew Thomson, of Auchterarder House, Auchterarder (Aberdeen-Angus), " Portunus of Auchterarder " (81,982).
2nd No. 426 Dawson, George, Phingask, Fraserburgh (Shorthorn), " Collynie Dyester."
V No. 427 Elgin and Kincardine, The Earl of, C.M.G., Broomhall, Dunfermline (Aberdeen-Angus Bull—Shorthorn Cross Cow).
H No. 436 Walker, Robert W., Portlethen, Aberdeen (Aberdeen-Angus Bull—Aberdeen-Angus / Shorthorn Cross Cow), " Patrick."
C No. 431 Paterson, R. Jardine, of Balgray, Lockerbie (Shorthorn Bull—Galloway Cow), " Yo-Yo."

CLASS 63. HEIFER, any pure breed or cross, and of any age.—PREMIUMS, £7 and £3.

1st No. 439 Gourlay, Francis N. M., Kirkland, Tynron, Dumfriesshire (Galloway), " Favourite 5th of Kirkland " (34,404).
2nd No. 437 Beddie, James, Banks, Strichen (Aberdeen-Angus).
V No. 438 Brodie, Messrs, Lethen, Nairn (Aberdeen-Angus), " Edella 6th of Lethen " (98,990).
H No. 442 Sandeman, F. D. Stewart, The Laws, Kingennie, Angus (Aberdeen-Angus), " Elite Burma of Skillymarno " (96,735).

DAIRY COW.

CLASS 64. Cancelled owing to insufficient entries.

Special Prizes for Dairy Cows.

COWS from Grade " A " (Tuberculin Tested) or Certified Herds, drawn from Classes 28, 38, 39, 40, 47, 48, 49, 56, and 64.—PREMIUMS, £12, £8, £5, and £3.

1st No. 301 Montgomerie, Adam W., of Lessnessock, Ochiltree, " Cauldhame Moss 2nd " (21,253).
2nd No. 304 Ardgowan Estates Limited, Ardgowan, Inverkip, " Ardgowan Griselda " (35,470).
3rd No. 307 Clark, John, Dunrod Farm, Inverkip, " Dunrod Mist 3rd " (33,178).
4th No. 294 Cross, Robert, of Knockdon, Maybole, " Knockdon Beautiful " (2068).
V No. 296 Cross, Robert, of Knockdon, Maybole, " Knockdon Derby Girl " (24,406).

CLASS 65. DAIRY COW, in Milk, drawn from Classes 28, 38, 39, 47, 49, 56, and 64.

Perpetual Gold Challenge Cup, presented by the Corporation of the City of Edinburgh to commemorate the Hundredth Show of the Highland and Agricultural Society of Scotland. *The Cup is offered this year for the best Dairy Cow, in Milk, entered in Classes* 28, 38, 39, 47, 49, 56, *and* 64. *" Extra Stock " eligible to compete.*

No. 303 M'Alister, James, Meikle Kilmory, Rothesay, " Meikle Kilmory Rosary " (91,252).

Reserve—No. 291 Butter, Colonel C. A. J., Cluniemore Home Farm, Pitlochry, " Cluniemore Amber " (22,068).

A Gold Medal, value 10 Guineas, given by Dr T. G. Nasmyth, Edinburgh, *to the winner as a memento of his winning the Cup.*

No. 303 M'Alister, James, Meikle Kilmory, Rothesay, " Meikle Kilmory Rosary " (91,252).

HORSES

CLYDESDALE STALLION AND COLT.

DUKE OF YORK CHAMPION SILVER MEDAL
for best Clydesdale Stallion or Colt.

No. 479 Kilpatrick, James, Craigie Mains, Kilmarnock, " Craigie Realisation."

Reserve—No. 461 Clark, Alexander, Strathore, Thornton, Fife, " Strathore Majestic " (22,195).

Paisley Perpetual Gold Challenge Cup, value £300, *for best Clydesdale Stallion or Colt, " Extra Stock " being eligible to compete.* This Cup, along with an endowment of £600, was provided from money collected in Paisley by the late Provost Muir M'Kean, and is in commemoration of the Society's first Show at Paisley in 1913.

No. 479 Kilpatrick, James, Craigie Mains, Kilmarnock, " Craigie Realisation."

Reserve—No. 461 Clark, Alexander, Strathore, Thornton, Fife, " Strathore Majestic " (22,195).

Cawdor Challenge Cup, value 50 Guineas, *for best Clydesdale Stallion or Colt registered in the Clydesdale Stud-Book.* Given by the Clydesdale Horse Society.

No. 479 Kilpatrick, James, Craigie Mains, Kilmarnock, " Craigie Realisation."

Breeder of best Male Animal of any age in Classes 66 to 69—The Silver Medal.

No. 479 Kilpatrick, James, Craigie Mains, Kilmarnock.

CLASS 66. STALLION, born before 1930.—PREMIUMS, £20, £15, £10, and £4.

1st No. 448 Templeton, T. & M., Sandyknowe, Kelso, " Benemerito " (21,837).
2nd No. 449 Wyllie, Scott, Milton of Luncarty, Perth, " Milton Invincible " (21,901).
3rd No. 444 Armstrong, Joseph A., The Beeches, Tarraby, Carlisle, " Mereside Refiner " (21,898).
4th No. 446 Park, Robert, Brunstane, Portobello, " Culraven Concord " (21,741).

CLASS 67. ENTIRE COLT, born in 1930.—PREMIUMS, £20, £15, £10, and £4.

1st No. 455 Templeton, T. & M., Sandyknowe, Kelso, " Eminence " (21,991).
2nd No. 450 Adams, David, Auchencraig, Dumbarton, " Full Cry " (21,995).
3rd No. 451 Baillie, J. D. S., East Grange, Blairhall, Fife, " Landmark " (22,011).

William Taylor Memorial Prize of £10 and Certificate *to the breeder of the best Clydesdale Colt entered in Classes* 68 *and* 69. Given by William Taylor Memorial Committee.

No. 479 Kilpatrick, James, Craigie Mains, Kilmarnock, " Craigie Realisation."

CLASS 68. ENTIRE COLT, born in 1931.—PREMIUMS, £20, £15, £10, and £4.

1st No. 461 Clark, Alexander, Strathore, Thornton, Fife, " Strathore Majestic " (22,195).
2nd No. 467 Templeton, T. & M., Sandyknowe, Kelso, " Beneficial " (22,074).
3rd No. 462 Clark, Allan, Woodbank, Windygates, " Woodbank Baron " (22,205).
4th No. 465 Reith, Miss E. M., Kennerty Farm, Peterculter, " Reprint."
V No. 464 Kilpatrick, James, Hawkrigg House, Wigton, Cumberland, " Hawkrigg Eldorado " (22,138).
H No. 463 Johnston, John, & Son, Dunmore Home Farm, Falkirk, " Dunmore Mark."
C No. 469 Thomson, William A., Newton, Markinch, " Newton Monarch " (22,171).
C No. 468 Templeton, T. & M., Sandyknowe, Kelso, " Benamir " (22,072).

CLASS 69. ENTIRE COLT, born in 1932.—PREMIUMS, £15, £9, £6, and £4.

1st No. 479 Kilpatrick, James, Craigie Mains, Kilmarnock, " Craigie Realisation."
2nd No. 483 Templeton, T. & M., Sandyknowe, Kelso.
3rd No. 478 Johnston, John, & Son, Dunmore Home Farm, Falkirk, " Balmanno Castle."
4th No. 475 Clark, Allan, Woodbank, Windygates.
V No. 482 Reith, Miss E. M., Kennerty Farm, Peterculter, " Remarkable."
H No. 481 Murdoch, Henry, Balgreen, Hollybush, " Balgreen Castle."
C No. 474 Clark, Alexander, Strathore, Thornton, Fife, " Strathore Cavalcade."

CLYDESDALE GELDING.

Got by a registered Clydesdale Stallion.

DUKE OF YORK CHAMPION SILVER MEDAL
for best Clydesdale Gelding.

No. 487 Clark, James, Windlaw, Carmunnock, " Willie."

Reserve—No. 498 Wilson, William, Black Byres, Barrhead, " Ben."

The Meiklem Gold Challenge Cup, valued 110 Guineas, *for best Clydesdale Gelding, " Extra Stock " eligible to compete.* Given by Mr William Meiklem, Bennochy Park, Kirkcaldy.

No. 487 Clark, James, Windlaw, Carmunnock, " Willie."

Reserve—No. 498 Wilson, William, Black Byres, Barrhead, " Ben."

CLASS 70. GELDING, born before 1930.—PREMIUMS, £15, £9, £6, and £4.

1st	No. 487	Clark, James, Windlaw, Carmunnock, " Willie."
2nd	No. 488	Greig, Messrs, Housenrigg, Brayton, Aspatria, Cumberland, " The Yett."
3rd	No. 489	Sommerville, R. & J., Smeaton, Dalkeith, " Dick."
4th	No. 486	Clark, Alexander, Strathore, Thornton, Fife, " Captain."
V	No. 485	Cairns, James, Lochmalony, Cupar, " Lochmalony."

CLASS 71. GELDING, born in 1930.—PREMIUMS, £15, £9, £6, and £4.

1st	No. 498	Wilson, William, Black Byres, Barrhead, " Ben."
2nd	No. 490	Buttar, Trustees of the late T. A., Corston, Coupar-Angus, " Bob."
3rd	No. 494	Macintyre, A. M., Towie Barclay, Auchterless, " Dick."
4th	No. 493	Greig, Messrs, Housenrigg, Brayton, Aspatria, Cumberland, " Fashion."
V	No. 497	Swan, Harry, Balhungie, Monifieth, " Peter."
H	No. 496	Motion, John, Keillor, Coupar-Angus.
C	No. 491	Buttar, Trustees of the late T. A., Corston, Coupar-Angus, " Mac."
C	No. 492	Gardner, William, Springfield, Linlithgow, " Flask."

CLASS 72. GELDING, born in 1931.—PREMIUMS, £15, £9, £6, and £4.

1st	No. 502	Clark, James, Windlaw, Carmunnock, " Windlaw.'
2nd	No. 499	Ashbridge, Joseph, Newton Reigney, Penrith.
3rd	No. 501	Campbell, G. & J., Gartness, Balfron.
4th	No. 500	Cairns, James, Lochmalony, Cupar, " Sweep."

CLASS 73. GELDING, born in 1932.—PREMIUMS, £12, £8, £4, and £2.

1st No. 508 Sharp, T. Mercer, Bardrill, Blackford, " Tom."
2nd No. 510 Young, William, West Preston, Preston Mill, Dumfries, " Preston Sandy."
3rd No. 507 Park, Robert, Brunstane, Portobello.
4th No. 511 Young, William, West Preston, Preston Mill, Dumfries, " Preston Jamie."

CLYDESDALE MARE AND FILLY.

DUKE OF YORK CHAMPION SILVER MEDAL for best Clydesdale Mare or Filly.

No. 551 Murdoch, Alexander, East Hallside, Cambuslang, Lanarkshire, " Faraway."

Reserve—No. 520 Beck, G. M., The Lane, Ravenstonedale, Westmorland, " Lane Lucky Girl."

Cawdor Challenge Cup, value 50 Guineas, *for best Clydesdale Mare or Filly registered in the Clydesdale Stud-Book.* Given by the Clydesdale Horse Society.

No. 551 Murdoch, Alexander, East Hallside, Cambuslang, Lanarkshire, " Faraway."

CLASS 74. MARE, of any age, with Foal at foot, or due to foal before 31st July 1933.—PREMIUMS, £20, £12, £7, and £4.

1st No. 513 Beck, G. M., The Lane, Ravenstonedale, Westmorland, " Lane Snowflake."
2nd No. 515 Kerr, J. E., of Harviestoun, Dollar, " Harviestoun Nadine " (59,416).
3rd No. 519 Reith, Miss E. M., Kennerty Farm, Peterculter, " Sunrise."
4th No. 518 Murdoch, Alexander, East Hallside, Cambuslang, Lanarkshire, " Owaissa."
V No. 512 Beck, G. M., The Lane, Ravenstonedale, Westmorland, " Lane Mayflower."
H No. 514 Hamilton, John, Dronley, Dundee, " Perfect Swell."

CLASS 75. YELD MARE, born before 1930.—PREMIUMS, £15, £9, £6, and £4.

1st No. 520 Beck, G. M., The Lane, Ravenstonedale, Westmorland, " Lane Lucky Girl."
2nd No. 524 Park, Misses J. & M., Brunstane, Portobello, " Vanessa " (56,954).
3rd No. 521 Cairns, James, Lochmalony, Cupar, " Lochmalony Lily."
4th No. 523 Murdoch, Alexander, East Hallside, Cambuslang, Lanarkshire, " Fyvie Primrose " (59,515).
V No. 522 Kerr, J. E., of Harviestoun, Dollar, " Harviestoun Nora."

CLASS 76. YELD MARE or FILLY, born in 1930.—PREMIUMS, £15, £9, £6, and £4.

1st	No. 530	Murdoch, Henry, Balgreen, Hollybush, Filly, " Balgreen Charm."
2nd	No. 528	Ferguson, William L., East Cairnweil, Stranraer, Filly, " Rose Marie."
3rd	No. 526	Campbell, G. & J., Gartness, Balfron, Filly, " Gartness Gay Lass."
4th	No. 532	Templeton, T. & M., Sandyknowe, Kelso, Filly, " Harmonica."
V	No. 525	Armstrong, Joseph A., The Beeches, Tarraby, Carlisle, Filly, " Vera."
H	No. 529	Murdoch, Alexander, East Hallside, Cambuslang, Lanarkshire, Filly, " Charm."

CLASS 77. FILLY, born in 1931.—PREMIUMS, £15, £9, £6, and £4.

1st	No. 534	Dalziel, Lord, P.C., Borgue House, Kirkcudbright, " Belle o' Borgue."
2nd	No. 536	Kerr, J. E., of Harviestoun, Dollar, " Harviestoun Nina."
3rd	No. 535	Dalziel, Robert, Rue, Auldgirth, " Rue Mescelline."
4th	No. 533	Beaton, James & Frank, Mains of Glack, Pitcaple, " Glack Sunray."
V	No. 540	Taylor, Robert, Milton Hall, Brampton Junction, Cumberland, " Lady Bute."
H	No. 539	Sleigh, John P., of St John's Wells, Fyvie, " Linda."

CLASS 78. FILLY, born in 1932.—PREMIUMS, £15, £9, £6, and £4.

1st	No. 551	Murdoch, Alexander, East Hallside, Cambuslang, Lanarkshire, " Faraway."
2nd	No. 549	Kilpatrick, James, Craigie Mains, Kilmarnock, " Craigie Radiance."
3rd	No. 546	Glashen, James & John, The Hill, Milltimber, " Hill Sunbeam."
4th	No. 553	Russell, Andrew, Summerston, Maryhill, " Heart's Content."
V	No. 542	Aitkenhead, Walter A., Haining Valley, Linlithgow, " Haining Jean."
H	No. 544	Cairns, James, Lochmalony, Cupar, " Lochmalony Emma."
C	No. 547	Kerr, J. E., of Harviestoun, Dollar, " Harviestoun Promise."
C	No. 554	Sleigh, Harry P., Strichen Mains, Strichen, " Malva."

SHIRE.

CLASS 79. Cancelled owing to insufficient entries.

SUFFOLK.

DUKE OF YORK CHAMPION SILVER MEDAL
for best Suffolk Gelding.

No. 556 Muir, Thomas, Son, & Patton, Limited, Nethergate House, Dundee, " Rob Roy."

Reserve—No. 560 Paul, Stuart, Kirton Lodge, Ipswich, " Prince."

CLASS 80. GELDING, born before 1931, got by a registered Suffolk Stallion.—PREMIUMS, £15, £9, £6, and £4.

1st	No. 556	Muir, Thomas, Son, & Patton, Limited, Nethergate House, Dundee, " Rob Roy."
2nd	No. 560	Paul, Stuart, Kirton Lodge, Ipswich, " Prince."
3rd	No. 555	Garrard, Frank, Rochfort, The Hall, Framlingham, Woodbridge, Suffolk, " Marmaduke."
4th	No. 557	Muir, Thomas, Son, & Patton, Limited, Nethergate House, Dundee, " Bowler."
V	No. 559	Muir, Thomas, Son, & Patton, Limited, Nethergate House, Dundee, " Captain."
H	No. 558	Muir, Thomas, Son, & Patton, Limited, Nethergate House, Dundee, " Boxer."

HUNTERS.

DUKE OF YORK CHAMPION SILVER MEDAL
for best Hunter.

No. 566 Currie, Miss Thomson, Clatto, Cupar, Fife, Gelding, " Mark Anthony."
Reserve—No. 594 Black, W. C. G., Chapel, Kingskettle, Fife, Gelding, " Ramoneur."

Dumfries Centenary Silver Challenge Cup, value £100, *for best Hunter, " Extra Stock " not eligible to compete.* Presented by members of the Dumfriesshire Hunt to commemorate the centenary of the Highland Society's first Show at Dumfries in 1830.

No. 566 Currie, Miss Thomson, Clatto, Cupar, Fife, Gelding, " Mark Anthony."

CLASS 81. HUNTER BROOD MARE, with Foal at foot, or due to foal before 31st July 1933.—PREMIUMS, £15, £7, and £3.

1st	No. 562	Low, Miss Katherine, Bridgelands, Selkirk, " Mrs Brady."
2nd	No. 561	Cheape, Brig.-General G. R. H., C.M.G., D.S.O., M.C., Wellfield, Gateside, Fife, " Indian Lady."

Best Hunter Filly, entered in Classes 82 to 84, registered with a number in the Hunter Stud-Book, or the entry tendered within one month of the award—Champion Gold Medal. Given by the Hunters' Improvement and National Light Horse Breeding Society.

No. 574 Currie, Miss Thomson, Clatto, Cupar, Fife, Filly, " Merry Ann " (7938).

Reserve—No. 564 Buchanan-Jardine, Sir John William, of Castlemilk, Bart., Castle Milk, Lockerbie, Filly, " Harmony VII." (7649).

CLASS 82. YELD MARE, FILLY, or GELDING, born in 1930—*in hand.*—PREMIUMS, £10, £5, and £3.

1st No. 566 Currie, Miss Thomson, Clatto, Cupar, Fife, Gelding, " Mark Anthony."
2nd No. 564 Buchanan-Jardine, Sir John William, of Castlemilk, Bart., Castle Milk, Lockerbie, Filly, " Harmony VII." (7649).
3rd No. 571 Parsons, Mrs E. H. T., Fordbank, Milliken Park, Renfrewshire, Gelding, " Long Fellow " (1502).
V No. 565 Campbell, Hon. Jean, Hunthill, Jedburgh, Gelding, " Bastion " (1687).
H No. 573 Thomson, Major A. D., of Nenthorn, Kelso, Gelding, " Novadra."
C No. 567 Duguid, Miss H. M., Manar, Inverurie, Gelding, " Veritas."
C No. 570 Parsons, Mrs E. H. T., Fordbank, Milliken Park, Renfrewshire, Mare, " Rosarch " (7689).
C No. 572 Spencer-Nairn, Major Sir Robert, Bart., Leslie House, Leslie, Fife, Filly, " Elizabeth Arden."

CLASS 83. YELD MARE, FILLY, or GELDING, born in 1931—*in hand.*—PREMIUMS, £10, £5, and £3.

1st No. 574 Currie, Miss Thomson, Clatto, Cupar, Fife, Filly, " Merry Ann " (7938).
2nd No. 576 Liddell-Grainger, Lady Muriel, Ayton Castle, Berwickshire, Filly, " Menin Gate."
3rd No. 580 Thomson, Major A. D., of Nenthorn, Kelso, Gelding.
V No. 575 Dodgson, Miss, Coulmore, Kessock, Inverness, Gelding, " Viscount Ross."
H No. 579 Spencer-Nairn, Major Sir Robert, Bart., Leslie House, Leslie, Fife, Filly, " The Bridesmaid."

CLASS 84. FILLY, COLT, or GELDING, born in 1932—*in hand.*—PREMIUMS, £10, £5, and £3.

1st No. 586 Parsons, Mrs E. H. T., Fordbank, Milliken Park, Renfrewshire, Gelding, " Peregrine."
2nd No. 584 Currie, Miss Thomson, Clatto, Cupar, Fife, Filly, " Delphinium " (7937).
3rd No. 581 Buchanan-Jardine, Sir John William, of Castlemilk, Bart., Castle Milk, Lockerbie, Gelding, " Hasty Bob " (1694).
V No. 590 Spencer-Nairn, Major Sir Robert, Bart., Leslie House, Leslie, Fife, Filly, " Bride."
H No. 591 Tennant, James C. A., Meldrum, Ratho, Mid-Lothian, Filly, " Coliseum."
C No. 583 Cheape, Brig.-General G. R. H., C.M.G., D.S.O., M.C., Wellfield, Gateside, Fife, Colt, " Indian Melody."
C No. 587 Sanderson, J. Martin, Linthill, Melrose, Filly, " Merry " (7987).

CLASS 85. MARE or GELDING, born before 1929, to carry 13 stone and over—*in saddle.*—PREMIUMS, £15, £10, and £5.

1st	No. 594	Black, W. C. G., Chapel, Kingskettle, Fife, Gelding, "Ramoneur."
2nd	No. 600	Liddell-Grainger, Lady Muriel, Ayton Castle, Berwickshire, Mare, "Ayton Mons Meg" (7771).
3rd	No. 596	Cheape, Brig.-General G. R. H., C.M.G., D.S.O., M.C., Wellfield, Gateside, Fife, Mare, "Priory Lass" (7507).
V	No. 597	Currie, Miss Thomson, Clatto, Cupar, Fife, Gelding, "True Destiny" (1200).
H	No. 601	Liddell-Grainger, Lady Muriel, Ayton Castle, Berwickshire, Gelding, "Ayton Macmerry" (1548).
C	No. 598	Drummond, Mrs, Megginch Castle, Errol, Perthshire, Gelding, "Missel Thrush."

CLASS 86. MARE or GELDING, born in 1929, to carry 12 stone 7 lbs. and over—*in saddle.*—PREMIUMS, £15, £10, and £5.

1st	No. 606	Parsons, Mrs E. H. T., Fordbank, Milliken Park, Renfrewshire, Gelding, "Friars Balsam."
2nd	No. 603	Cheape, Brig.-General G. R. H., C.M.G., D.S.O., M.C., Wellfield, Gateside, Fife, Gelding, "Ross of Mull."
3rd	No. 608	Scott, T. W. Robson, Lethem, Jedburgh, Gelding, "Jed" (1415).
V	No. 604	Elder, Captain A. J., Pitbauchlie, Dunfermline, Gelding, "Sunbar."
H	No. 610	Thomson, Major A. D., of Nenthorn, Kelso, Mare, "Forefront."

HIGHLAND AND WESTERN ISLAND PONIES.

DUKE OF YORK CHAMPION SILVER MEDAL for best Highland or Western Island Pony (*Classes* 87 *to* 91).

No. 628 Wilson, T. G., Carbeth Home Farm, Balfron Station, "Moldagh" (5939).

Reserve—No. 631 Wright, Major D. G. Moncrieff, M.C., of Kinmonth, Bridge of Earn, "Staffin Princess" (6236).

Special Prize of £8 given by the Highland Pony Society *for best Male Animal not exceeding* 14.2 *hands, entered in Classes* 87, 88, *and* 92. "*Extra Stock*" *not eligible to compete. Competition strictly confined to animals passed sound and free from hereditary disease.*

No. 616 Mackelvie, Donald, New Lanark, Lamlash, "Ruarie" (1835).

CLASS 87. STALLION, born before 1931, not exceeding 14.2 hands. PREMIUMS, £8, £4, and £2.

1st	No. 611	Macbeth, W. Gilchrist, of Dunira, Comrie, Perthshire, "Glen Boltichan" (1749).
2nd	No. 613	Wooley, Thomas, Commercial Hotel, Bonar Bridge, Sutherland, "Neil Gow" (1662).
3rd	No. 612	MacDonald, Colonel Archibald William, D.S.O., Blarour, Spean Bridge, "Ben Ieran" (1828).

EXTRA STOCK.

The following was awarded the Silver Medal:—

No. 614 Mackelvie, Donald, New Lanark, Lamlash, "Ranza" (1699).

CLASS 88. ENTIRE COLT, born on or after 1st January 1931, not exceeding 14.2 hands.—PREMIUMS, £6, £4, and £2.

1st No. 616 Mackelvie, Donald, New Lanark, Lamlash, "Ruarie" (1835).
2nd No. 618 Wooley, Thomas, Commercial Hotel, Bonar Bridge, Sutherland, "Rob Doun."
3rd No. 617 Purdie, Thomas, Aucheneck, Killearn, "Lord Lorne" (1829).
V No. 615 Honeyman, R. Wemyss, Derculich, Strathtay, "Jupiter of Derculich" (1834).

Special Prize of £8 given by Highland Pony Society *for best Female Animal not exceeding* 14.2 *hands, entered in Classes* 89, 90, *and* 91. "*Extra Stock*" *not eligible to compete. Competition strictly confined to animals passed sound and free from hereditary disease.*

No. 628 Wilson, T. G., Carbeth Home Farm, Balfron Station, "Moldagh" (5939).

CLASS 89. MARE, any age, not exceeding 14.2 hands, with Foal at foot, or due to foal before 31st July 1933.—PREMIUMS, £8, £4, and £2.

(No entry.)

CLASS 90. YELD MARE, born before 1931, not exceeding 14.2 hands. —PREMIUMS, £8, £4, and £2.

1st No. 628 Wilson, T. G., Carbeth Home Farm, Balfron Station, "Moldagh" (5939).
2nd No. 623 Honeyman, R. Wemyss, Derculich, Strathtay, "Marigold of Derculich" (6470).
3rd No. 624 Macbeth, W. Gilchrist, of Dunira, Comrie, "White Star of Duñira" (6057).
V No. 626 Sharp, Miss E. C., Balmuir, Dundee, "Glastaig of Dalnaglar" (6228).
H No. 619 Cox, Mrs, Gourdie, Murthly, "Norna."
C No. 625 Mackelvie, Donald, New Lanark, Lamlash, "Glen Alton" (4566).
C No. 629 Wright, Major D. G. Moncrieff, M.C., of Kinmonth, Bridge of Earn, "Dorothy of Kinmonth" (5965).

EXTRA STOCK.

The following was awarded the Silver Medal:—

No. 631 Wright, Major D. G. Moncrieff, M.C., of Kinmonth, Bridge of Earn, "Staffin Princess" (6236).

CLASS 91. FILLY, born on or after 1st January 1931, not exceeding 14.2 hands.—PREMIUMS, £6, £4, and £2.

1st No. 635 Wilson, T. G., Carbeth Home Farm, Balfron Station, " Seonaid."
2nd No. 633 Mackelvie, Donald, New Lanark, Lamlash, " Fiona " (6472).
3rd No. 632 Elford, Miss Lilian, Rosehaugh, Avoch, Ross-shire, " Lady Iona."
V No. 634 Webster, Miss E. Ruth, Ashbrook, Arbroath, " Kelpie of Ashbrook " (6475).

CLASS 92. GELDING, born before 1931, not exceeding 14.2 hands. —PREMIUMS, £6, £4, and £2.

1st No. 636 Webster, Miss E. Ruth, Ashbrook, Arbroath, " Glenninian " (1651).

SHETLAND PONIES.

(ALL SHOWN IN HAND.)

DUKE OF YORK CHAMPION SILVER MEDAL for best Shetland Pony.

No. 648 Kerr, J. E., of Harviestoun, Dollar, " Harviestoun Pryde " (4544).

Reserve—No. 640 Mungall, William, of Transy, Dunfermline, " Sonyad of Transy " (1105).

Fife and Kinross Perpetual Gold Challenge Cup, value £200, *for best Shetland Pony, " Extra Stock " being eligible to compete.* This Cup along with an endowment of £400, was subscribed for by the Counties of Fife and Kinross in commemoration of the Society's first Show at Cupar-Fife in 1912.

No. 648 Kerr, J. E., of Harviestoun, Dollar, " Harviestoun Pryde " (4544).

Reserve—No. 640 Mungall, William, of Transy, Dunfermline, " Sonyad of Transy " (1105).

Best Group of Shetland Ponies, drawn from the ordinary Classes, consisting of one male and two females—£10. Given by " Four Lovers of the Breed," per Mr W. Mungall of Transy.

Nos. 640, 660, 666 Mungall, William, of Transy, Dunfermline.

Silver Medal *for the best Shetland Pony of the sex opposite to that of the winner of the President's Medal, entered or eligible for entry in the Shetland Pony Stud-Book.* Given by the Shetland Pony Stud-Book Society.

No. 640 Mungall, William, of Transy, Dunfermline, " Sonyad of Transy " (1105).

CLASS 93. STALLION, not exceeding 10½ hands, born before 1930.—PREMIUMS, £8, £5, £3, and £2.

1st	No. 640	Mungall, William, of Transy, Dunfermline, "Sonyad of Transy" (1105).
2nd	No. 639	Manson, P. F., Maryfield, Bressay, Lerwick, "Bright Star of Maryfield" (1045).
3rd	No. 637	Davidson, Alexander, Mundurno, Bridge of Don, Aberdeen, "Mars of Earlshall" (1292).
4th	No. 638	Davidson, Alexander, Mundurno, Bridge of Don, Aberdeen, "Pepper of Auchlochan."

EXTRA STOCK.

The following was awarded the Silver Medal :—

No. 641 Macbeth, W. Gilchrist, of Dunira, Comrie, "Dollar Boy" (1242).

The following was awarded the Medium Silver Medal.

No. 642 Mungall, William, of Transy, Dunfermline, "Kitmagur of Penniwells" (1246).

CLASS 94. ENTIRE COLT, not exceeding 10½ hands, born in 1930 or 1931.—PREMIUMS, £8, £5, £3, and £2.

1st	No. 645	Macbeth, W. Gilchrist, of Dunira, Comrie, "Hero of Dunira."
2nd	No. 646	Mungall, William, of Transy, Dunfermline, "Saidemor of Transy."
3rd	No. 644	Kerr, J. E., of Harviestoun, Dollar, "Harviestoun Snaefell."
4th	No. 643	Duguid, Miss H. M., Manar, Inverurie, "Birk of Manar."
V	No. 647	Wyllie, Miss J. M., Longhaugh House, Dundee, "Birkie of Earlshall."

CLASS 95. MARE, not exceeding 10½ hands, with Foal at foot, or due to foal before 31st July 1933.—PREMIUMS, £8, £5, £3, and £2.

1st	No. 648	Kerr, J. E., of Harviestoun, Dollar, "Harviestoun Pryde" (4544).
2nd	No. 649	Macbeth, W. Gilchrist, of Dunira, Comrie, "Agnes of Earlshall" (4548).
3rd	No. 652	Mungall, William, of Transy, Dunfermline, "Sunbeam of Transy" (4353).
4th	No. 653	Mungall, William, of Transy, Dunfermline, "Satia of Transy" (4449).

CLASS 96. YELD MARE, not exceeding 10½ hands.—PREMIUMS, £8, £5, £3, and £2.

1st	No. 660	Mungall, William, of Transy, Dunfermline, "Maid of Kirkland" (4446).
2nd	No. 657	Kerr, J. E., of Harviestoun, Dollar, "Harviestoun Sheba" (4511).
3rd	No. 654	Butter, Misses J. & M., Cluniemore, Pitlochry, "Beret of Kirkland" (4434).
4th	No. 659	Manson, P. F., Maryfield, Bressay, Lerwick, "Thora of Maryfield" (4228).
V	No. 656	Duguid, Miss H. M., Manar, Inverurie, "Merry Dancer" (4362).
H	No. 655	Duguid, Miss H. M., Manar, Inverurie, "Black Pride of Maryfield" (4081).

CLASS 97. FILLY, not exceeding 10½ hands, born in 1930 or 1931. —PREMIUMS, £8, £5, £3, and £2.

1st	No. 664	Macbeth, W. Gilchrist, of Dunira, Comrie, " May Morn of Earlshall."
2nd	No. 666	Mungall, William, of Transy, Dunfermline, " Stelmone of Transy."
3rd	No. 662	Duguid, Miss H. M., Manar, Inverurie, " Thule Pride."
4th	No. 661	Butter, Misses J. & M., Cluniemore, Pitlochry, " Balmohr Trudie."
V	No. 663	Kerr, J. E., of Harviestoun, Dollar, " Harviestoun Sonia."
H	No. 665	Macbeth, W. Gilchrist, of Dunira, Comrie, " May of Earlshall."

SADDLE CLASSES.

CLASS 98. MARE or GELDING, any age, over 13.2 hands, and not exceeding 15 hands—*in saddle.*—PREMIUMS, £5, £3, and £2.

1st	No. 669	Liddell-Grainger, Lady Muriel, Ayton Castle, Berwickshire, Mare, " Mida."
2nd	No. 670	Salvesen, Miss E., Lathallan, Polmont, Mare, " Ettrick."
3rd	No. 671	Webster, Miss E. Ruth, Ashbrook, Arbroath, Mare, " Avro."
V	No. 668	Duguid, Miss H. M., Manar, Inverurie, Gelding, " Harmony."
H	No. 667	Currie, Miss Thomson, Clatto, Cupar, Fife, Gelding, " Mascot."
C	No. 672	Woodger, Jack, Golfhall Kennels, Corstorphine, Edinburgh, Mare, " Shot Silk."

CLASS 99. MARE or GELDING, any age, not exceeding 13.2 hands—*in saddle.*—PREMIUMS, £5, £3, and £2.

1st	No. 673	Ayton Castle Pony Stud (per Lady Muriel Liddell-Grainger), Berwickshire, Mare, " Quicksilver II."
2nd	No. 676	Macmillan, Miss Marjorie, Carlestoun House, Torrance-of-Campsie, Gelding, " Tom Tit."
3rd	No. 674	Ayton Castle Pony Stud (per Lady Muriel Liddell-Grainger), Berwickshire, Gelding, " Taffy."
V	No. 675	Dunsmore, Buchanan, Comely Bank, Perth, Gelding, " Needle."

HORSES IN HARNESS.

DUKE OF YORK CHAMPION SILVER MEDAL for best Animal in the Classes for Horses in Harness.

No. 679 Hamilton, R. & J., 410 Rutherglen Road, Glasgow, Gelding, " Glenavon Glory " (G 223).

Reserve—No. 683 Macmillan, Walter, Carlestoun House, Torrance-of-Campsie, Mare, " All Trumps " (26,894).

CLASS 100. YELD MARE, FILLY, or GELDING, any age, in Harness, exceeding 15 hands, to be driven in the ring.—PREMIUMS £15, £10, and £5.

1st	No. 679	Hamilton, R. & J., 410 Rutherglen Road, Glasgow, Gelding, " Glenavon Glory " (G 223).
2nd	No. 677	Brown, John, Jun., Bunessan, Buchlyvie, Gelding, " Broompark Matchless."

CLASS 101. YELD MARE, FILLY, or GELDING, any age, in Harness, over 14 hands and not exceeding 15 hands, to be driven in the ring. —PREMIUMS, £15, £10, and £5.

1st	No. 683	Macmillan, Walter, Carlestoun House, Torrance-of-Campsie, Mare, " All Trumps " (26,894).
2nd	No. 682	Hamilton, R. & J., 410 Rutherglen Road, Glasgow, Mare, " Riquette " (26,483).
3rd	No. 680	Fitchet, George, Jun., Law Farm Dairy, Dundee, Mare, " Merevale Maiden " (26,728).

CLASS 102. YELD MARE, FILLY, or GELDING, any age, in Harness, not exceeding 14 hands, to be driven in the ring.—PREMIUMS, £10, £5, and £3.

1st	No. 687	Hamilton, John M., Bogton, Muirend, Glasgow, Gelding, " Wensleydale Swell " (G 669).
2nd	No. 688	Lawson, William, Greenhill, Paisley, Gelding, " Glenavon Adept " (14,723).
3rd	No. 684	Arnott, Robert, South Letham Farm, Falkirk, Mare, " Miss Appleby " (26,052).
V	No. 685	Brown, John, Jun., Bunessan, Buchlyvie, Gelding, " Broompark Elegant."

DRAUGHT GELDINGS IN HARNESS.

CLASS 103. DRAUGHT GELDING in Cart Harness (to be shown without vehicle), it being a condition that the Horse must have been regularly worked for a period of 12 weeks prior to the first day of the Show—PREMIUMS, £10, £5, £3, £2, and £1.

1st	No. 4	Mutter, Howey, & Co., Limited, 51-53 Charlotte Street, Aberdeen.
2nd	No. 2	Buttar, Trustees of the late Thomas A., Corston, Coupar-Angus, " Speed."
3rd	No. 7	Stevenson, Francis, & Sons, Limited, Lawside Dyeworks, Dundee.
4th	No. 8	Watson, James, Balhousie, Carnoustie, " Dan."
5th	No. 1	Buttar, Trustees of the late Thomas A., Corston, Coupar-Angus, " Major."
V	No. 3	Gellatly, Peter, Hillhead, Kinettles, Forfar, " Frank."
H	No. 6	Stevenson, Francis, & Sons, Limited, Lawside Dyeworks, Dundee.
C	No. 5	Smith, Hood, & Co., Limited, 48 Union Street, Dundee, " Kelvin."

JUMPING COMPETITIONS.

Champion Prize of £10 *for the most points in Prizes with one Horse in Classes* 1, 3, *and* 5.

Conditions.—First Prize to count five points; Second prize, four points; Third Prize, three points; Fourth Prize, two points; Fifth Prize, one point. The money to be evenly divided in the event of a tie.

Equal Foster, F. W., Etwall, Derby, Gelding, " Swank " (11 points).
Grange, F. V., Alvaston, Nantwich, Gelding, " Desire " (11 points).

CLASS 1. HORSE or PONY, any height.—Premiums, £20, £15, £10, £5, and £3.

1st	equal	Foster, F. W., Etwall, Derby, Gelding, " Swank."
2nd		Grange, F. V., Alvaston, Nantwich, Gelding, " Desire."
3rd		Taylor, Joseph, Moss Hall, Stretton, Warrington, Gelding, " Tiny."
4th	equal	Bradley, Ernest, Newton Grange, Great Ayton, Gelding, " Topper."
5th		Taylor, Joseph, Moss Hall, Stretton, Warrington, Gelding, " Humphrey."

CLASS 2. HORSE or PONY, any height, confined to competitors permanently resident in Scotland. The Horse or Pony to have been the property of the competitor since 1st May 1933.—Premiums, £10, £8, £5, £3, and £2.

1st	Ronaldson, George, Jun., Westerseat, Wick, Mare, " Beauty."
2nd	M'Crone, R. C., 26 Fleming Street, Riccarton, Kilmarnock, Gelding, " Mystic Sign."
3rd	Ronaldson, William, Westerseat, Wick, Mare, " Tiby."
4th	Scott, John, Oriel Road, Kirkcaldy, Gelding, " Bogey Man."
5th	Moncur, Thomas K., Belford Riding Academy, Edinburgh, Mare, " Coylet."

CLASS 3. HORSE or PONY, any height, Handicap, hurdles and gate being raised 8 inches for the winner of the First Prize, and 4 inches for the winner of the Second Prize in Class 1.—Premiums, £20, £15, £10, £5, and £3.

1st	equal	Constable, Miss Marjorie, Riding School, Bucksburn, Gelding, " Mirth."
2nd		Foster, F. W., Etwall, Derby, Gelding, " Swank."
3rd		Grange, F. V., Alvaston, Nantwich, Gelding, " Desire."
4th		Taylor, Joseph, Moss Hall, Stretton, Warrington, Gelding, " Tiny."
5th		Young, John B., 33 Carrick Street, Ayr, Gelding, " Toby."

CLASS 4. HORSE or PONY, any height.—PREMIUMS, £10, £8, £5, £3, and £2.

1st	equal	Bradley, Ernest, Newton Grange, Great Ayton, Gelding, " Topper."
2nd		Grange, F. V., Alvaston, Nantwich, Gelding, " Desire."
3rd		Grange, F. V., Alvaston, Nantwich, Mare, " Lady Moon."
4th		Makin, Thomas, Newton Farm, near Castleford, Yorkshire, Gelding, " Silver Mint."
5th		Taylor, Joseph, Moss Hall, Stretton, Warrington, Gelding, " Humphrey."
6th		Taylor, Joseph, Moss Hall, Stretton, Warrington, Gelding, " Tiny."

CLASS 5. HORSE or PONY, any height, Handicap, hurdles and gate being raised 8 inches for the winner of the First Prize, and 4 inches for the winner of the Second Prize in either of Classes 1 or 3—4 inches extra for the winner of the two First Prizes in Classes 1 and 3.—PREMIUMS, £15, £10, £5, £3, and £2.

1st	equal	Constable, Miss Marjorie, Riding School, Bucksburn, Gelding, " Mirth."
2nd		Foster, F. W., Etwall, Derby, Gelding, " Swank."
3rd		Grange, F. V., Alvaston, Nantwich, Gelding, " Desire."
4th		Makin, Thomas, Newton Farm, near Castleford, Yorkshire, Gelding, " Silver Mint."
5th		Allen, P. L. R., Davenham Hall, Northwich, Gelding, " Tony."

SHEEP

BLACKFACE.

DUKE OF YORK CHAMPION SILVER MEDAL for best Blackface Sheep.

No. 721 Hamilton, Matthew G., Woolfords, Cobbinshaw.

Reserve—No. 708 Mitchell, William, Hazelside, Douglas, " Mountaineer."

Renfrewshire Perpetual Gold Challenge Cup, value £250, *for best Blackface Sheep, " Extra Stock " eligible to compete.* This Cup, along with an endowment of £500, was provided from money collected in Renfrewshire by the late Provost Muir M'Kean of Paisley, and is in commemoration of the Society's first Show in the county of Renfrew in 1913.

No. 721 Hamilton, Matthew G., Woolfords, Cobbinshaw.

Reserve—No. 708 Mitchell, William, Hazelside, Douglas, " Mountaineer."

The " James Archibald " Prize, of about £20, *for the best Sheep in the Blackface Classes (excluding Lambs), " Extra Stock " eligible to compete.* This Prize consists of the annual free income from a fund of £600, gifted by the late Mr David Archibald, Christchurch, New Zealand, to found a Prize to be offered at the Annual Shows of the Society in commemoration of his brother, the late James Archibald, Overshiels, Stow.

No. 721 Hamilton, Matthew G., Woolfords, Cobbinshaw.

CLASS 104. TUP, three Shear and over.—PREMIUMS, £12, £8, £4, and £2.

1st No. 696 Marshall & Mitchell, Bleaton, Blairgowrie.
2nd No. 693 Hamilton, Matthew G., Woolfords, Cobbinshaw, " Golden Hazel."
3rd No. 695 Macdonald, James A., Urlar, Aberfeldy.
4th No. 697 Mitchell, William, Hazelside, Douglas, " Knight Errant."
V No. 692 Hamilton, Matthew G., Woolfords, Cobbinshaw, " Bob's Favourite."
H No. 691 Cayley, Arthur, Carham, Coldstream.
C No. 694 Hamilton, Matthew G., Woolfords, Cobbinshaw.

CLASS 105. TUP, two Shear.—PREMIUMS, £12, £8, £4, and £2.

1st No. 708 Mitchell, William, Hazelside, Douglas, " Mountaineer."
2nd No. 700 Brown, J. & T., Kirklandbank, Alyth.
3rd No. 699 Black, J. Belfrage, Holton, Milnathort.
4th No. 703 Hamilton, Matthew G., Woolfords, Cobbinshaw.

V	No. 707	Macgregor, A. R., Over Cardney Farm, Butterstone, Dunkeld.
H	No. 705	Macdonald, James A., Urlar, Aberfeldy, " Silver Blaze."
C	No. 698	Black, J. Belfrage, Holton, Milnathort.
C	No. 706	Macfarlane, James, Steps, Bridge of Cally, Blairgowrie.

CLASS 106. SHEARLING TUP.—PREMIUMS, £12, £8, £4, and £2.

1st	No. 721	Hamilton, Matthew G., Woolfords, Cobbinshaw.
2nd	No. 736	Mitchell, William, Hazelside, Douglas.
3rd	No. 718	Hamilton, Matthew G., Woolfords, Cobbinshaw.
4th	No. 737	Mitchell, William, Hazelside, Douglas.
V	No. 712	Brown, J. & T., Kirklandbank, Alyth.
H	No. 715	Cayley, Arthur, Carham, Coldstream.
C	No. 711	Brown, J. & T., Kirklandbank, Alyth.
C	No. 713	Brown, J. & T., Kirklandbank, Alyth.
C	No. 720	Hamilton, Matthew G., Woolfords, Cobbinshaw.
C	No. 722	Hamilton, Matthew G., Woolfords, Cobbinshaw.
C	No. 730	Macdonald, James A., Urlar, Aberfeldy.
C	No. 732	Macfarlane, James, Steps, Bridge of Cally, Blairgowrie.

CLASS 107. TUP LAMB.—PREMIUMS, £5, £3, and £2.

1st	No. 745	Lindsay, William, Balintore, Kirriemuir.
2nd	No. 741	Black, J. Belfrage, Holton, Milnathort.
3rd	No. 743	Brown, J. & T., Kirklandbank, Alyth.
V	No. 751	Molison, Alfred S., Wester Bleaton, Kirkmichael, Blairgowrie.
H	No. 756	Rottenburg, F. A., of Lochlane, Crieff.
C	No. 742	Black, J. Belfrage, Holton, Milnathort.
C	No. 753	Morgan, Andrew, Easter Denoon, Glamis.

CLASS 108. EWE, above one Shear (born before 1932), unclipped, with Lamb at foot.—PREMIUMS, £10, £5, £3, and £2.

1st	No. 762	Cayley, Arthur, Carham, Coldstream, " Flora Macdonald.'
2nd	No. 759	Brown, J. & T., Kirklandbank, Alyth.
3rd	No. 757	Black, J. Belfrage, Holton, Milnathort.
4th	No. 767	Mitchell, William, Hazelside, Douglas.
V	No. 766	Mitchell, William, Hazelside, Douglas.
H	No. 763	Findlay, Alexander, Hatton, Newtyle.
C	No. 765	Macfarlane, James, Steps, Bridge of Cally, Blairgowrie.

CLASS 109. SHEARLING EWE or GIMMER (born in 1932). PREMIUMS, £10, £5, £3, and £2.

1st	No. 773	Cayley, Arthur, Carham, Coldstream.
2nd	No. 771	Black, J. Belfrage, Holton, Milnathort.
3rd	No. 782	Lindsay, William, Balintore, Kirriemuir.
4th	No. 778	Lindsay, Thomas, Ascreavie, Kirriemuir.
V	No. 774	Cayley, Arthur, Carham, Coldstream.
H	No. 769	Black, J. Belfrage, Holton, Milnathort.
C	No. 776	Honeyman, R. Wemyss, Derculich, Strathtay.
C	No. 779	Lindsay, Thomas, Ascreavie, Kirriemuir.

CHEVIOT.

DUKE OF YORK CHAMPION SILVER MEDAL for best Cheviot Sheep.

No. 796 Douglas, Walter S., Hindhope, Jedburgh.

Reserve—No. 824 Elliot, Arthur, Hindhope, Jedburgh.

Borthwick Perpetual Challenge Cup, value £25, gifted by the late Mr J. Borthwick *for best Sheep in the Cheviot Classes.* Given by Cheviot Sheep Society.

No. 796 Douglas, Walter S., Hindhope, Jedburgh.

CLASS 110. TUP, above one Shear.—PREMIUMS, £12, £8, £4, and £2.

1st	No. 788	Douglas, Walter S., Hindhope, Jedburgh.
2nd	No. 794	Thorburn & Grieve, Glenormiston, Innerleithen, " Tit-Bits " (5079).
3rd	No. 791	Elliot, John, Blackhaugh, Clovenfords.
4th	No. 789	Douglas, Walter S., Hindhope, Jedburgh.
V	No. 792	Elliot, Robert T., Chatto, Kelso.
H	No. 793	Elliot, Robert T., Chatto, Kelso.
C	No. 790	Elliot, Arthur, Hindhope, Jedburgh.

CLASS 111. SHEARLING TUP.—PREMIUMS, £12, £8, £4, and £2.

1st	No. 796	Douglas, Walter S., Hindhope, Jedburgh.
2nd	No. 808	Thorburn & Grieve, Glenormiston, Innerleithen.
3rd	No. 803	Elliot, John, Blackhaugh, Clovenfords.
4th	No. 799	Elliot, Arthur, Hindhope, Jedburgh.
V	No. 807	Thorburn & Grieve, Glenormiston, Innerleithen.
H	No. 797	Douglas, Walter S., Hindhope, Jedburgh.
C	No. 804	Robson, John, Newton, Tarset.

CLASS 112. TUP LAMB.—PREMIUMS, £5, £3, and £2.

1st	No. 814	Elliot, Robert T., Chatto, Kelso.
2nd	No. 812	Elliot, John, Blackhaugh, Clovenfords.
3rd	No. 810	Elliot, Arthur, Hindhope, Jedburgh.
V	No. 813	Elliot, John, Blackhaugh, Clovenfords.
H	No. 809	Douglas, Walter S., Hindhope, Jedburgh.
C	No. 816	Thorburn & Grieve, Glenormiston, Innerleithen.
C	No. 815	Ross-Taylor, J. P., Mungoswalls, Duns.

CLASS 113. EWE, above one Shear, with Lamb at foot.—PREMIUMS, £10, £5, £3, and £2.

1st	No. 817	Douglas, Walter S., Hindhope, Jedburgh.
2nd	No. 818	Douglas, Walter S., Hindhope, Jedburgh.
3rd	No. 821	Elliot, Robert T., Chatto, Kelso.
4th	No. 819	Elliot, Arthur, Hindhope, Jedburgh.

CLASS 114. SHEARLING EWE or GIMMER.—PREMIUMS, £10, £5, £3, and £2.

1st	No. 824	Elliot, Arthur, Hindhope, Jedburgh.
2nd	No. 827	Elliot, Robert T., Chatto, Kelso.
3rd	No. 828	Elliot, Robert T., Chatto, Kelso.
4th	No. 822	Douglas, Walter S., Hindhope, Jedburgh.
V	No. 829	Robson, John, Newton, Tarset.
H	No. 823	Douglas, Walter S., Hindhope, Jedburgh.
C	No. 830	Robson, John, Newton, Tarset.

CLASS 115. EWE LAMB.—PREMIUMS, £5, £3, and £2.

1st	No. 836	Elliot, Robert T., Chatto, Kelso.
2nd	No. 835	Elliot, John, Blackhaugh, Clovenfords.
3rd	No. 838	Thorburn & Grieve, Glenormiston, Innerleithen.
V	No. 833	Elliot, Arthur, Hindhope, Jedburgh.
H	No. 832	Douglas, Walter S., Hindhope, Jedburgh.
C	No. 837	Ross-Taylor, J. P., Mungoswalls, Duns.

BORDER LEICESTER.

DUKE OF YORK CHAMPION SILVER MEDAL for best Border Leicester Sheep.

No. 844 Howie, James, & Sons, Muirside, Dumfries, " Noonday Sun."

Reserve—No. 925 Howie, James, & Sons, Muirside, Dumfries.

Gold Medal *for best Male Animal in the Border Leicester Classes, registered or eligible for registration in the Border Leicester Flock-Book. Animals entered as " Extra Stock " not eligible.* Given by the Society of Border Leicester Sheep Breeders.

No. 844 Howie, James, & Sons, Muirside, Dumfries, " Noonday Sun."

CLASS 116. TUP, above one Shear.—PREMIUMS, £12, £8, £4, and £2.

1st	No. 844	Howie, James, & Sons, Muirside, Dumfries, " Noonday Sun."
2nd	No. 841	Cameron, R. C., Greenlawdean, Berwickshire, " Sandyknowe Piecemaster " (8898).
3rd	No. 843	Forrest, Robert S., Thornhome, Carluke, " Thornhome Yadil " (8954).
4th	No. 845	Piper, James, of The Grange, Burntisland, " Sandyknowe Factor " (9273).
H	No. 839	Balfour, Lieut.-Colonel E. W. S., D.S.O., O.B.E., M.C., of Balbirnie, Markinch, " Perfect Model II." (9234).

CLASS 117. SHEARLING TUP.—PREMIUMS, £12, £8, £4, and £2.

1st	No. 860	Howie, James, Jun., Eglinton Mains, Irvine, " Golden Bar."
2nd	No. 862	Howie, James, & Sons, Muirside, Dumfries.
3rd	No. 857	Findlay, James, Bogardo, Forfar.
4th	No. 851	Cochrane, Alexander, Nethercraig, Kilmarnock, " Outstanding."
V	No. 866	Whyte, J. & J. L., Hayston, Glamis.
H	No. 855	Findlay, Alexander, Hatton, Newtyle.
C	No. 852	Cross, Robert, of Knockdon, Maybole, " Bonnie Briar " (9440).
C	No. 853	Cross, Robert, of Knockdon, Maybole, " The Miracle " (9742).

CLASS 118. TUP LAMB.—PREMIUMS, £8, £5, and £3.

1st	No. 885	Howie, James, & Sons, Muirside, Dumfries.
2nd	No. 880	Howie, A. B., Eshott Brocks, Felton, Morpeth.
3rd	No. 889	Templeton, George, Carnell Home Farm, Hurlford.
V	No. 879	Howie, A. B., Eshott Brocks, Felton, Morpeth.
H	No. 893	Young, John, Skerrington Mains, Hurlford.
C	No. 873	Findlay, Alexander, Hatton, Newtyle.
C	No. 884	Howie, James, & Sons, Muirside, Dumfries.
C	No. 892	Young, John, Skerrington Mains, Hurlford.

Gold Medal *for best Female Animal in the Border Leicester Classes, registered or eligible for registration in the Border Leicester Flock-Book. Animals entered as " Extra Stock " not eligible.* Given by the Society of Border Leicester Sheep Breeders.

No. 925 Howie, James, & Sons, Muirside, Dumfries.

CLASS 119. EWE, above one Shear.—PREMIUMS, £10, £5, £3, and £2.

1st	No. 903	Howie, A. B., Eshott Brocks, Felton, Morpeth.
2nd	No. 901	Findlay, James, Bogardo, Forfar.
3rd	No. 900	Findlay, Harry, Myreton, Dundee.
4th	No. 897	Cross, Robert, of Knockdon, Maybole.
H	No. 905	Milne, William M., Balbinny, Forfar.
C	No. 894	Balfour, Lieut.-Colonel E. W. S., D.S.O., O.B.E., M.C., of Balbirnie, Markinch.
C	No. 902	Forrest, Robert S., Thornhome, Carluke.

CLASS 120. SHEARLING EWE or GIMMER.—PREMIUMS, £10, £5, £3, and £2.

1st	No. 925	Howie, James, & Sons, Muirside, Dumfries.
2nd	No. 911	Chalmers, William, Summerfield, Dumfries.
3rd	No. 914	Cochrane, Alexander, Nethercraig, Kilmarnock.
4th	No. 924	Howie, A. B., Eshott Brocks, Felton, Morpeth.
V	No. 916	Findlay, Alexander, Hatton, Newtyle.
H	No. 923	Howie, A. B., Eshott Brocks, Felton, Morpeth.
C	No. 926	Milne, William M., Balbinny, Forfar.

CLASS 121. EWE LAMB.—PREMIUMS, £5, £3, and £2.

1st	No. 941	Howie, James, Jun., Eglinton Mains, Irvine.
2nd	No. 945	Milne, William M., Balbinny, Forfar.
3rd	No. 944	Howie, James, & Sons, Muirside, Dumfries.
V	No. 934	Findlay, Alexander, Hatton, Newtyle.
H	No. 942	Howie, James, Jun., Eglinton Mains, Irvine.
C	No. 939	Grant, John F., South Kingennie, Dundee.

HALF-BRED.

DUKE OF YORK CHAMPION SILVER MEDAL
for best Half-Bred Sheep.

No. 951 Elliot, John, Blackhaugh, Clovenfords.

Reserve—No. 956 M'Laren, William, Fairnington, Roxburgh.

CLASS 122. SHEARLING TUP.—PREMIUMS, £10, £7, and £3.

1st	No. 951	Elliot, John, Blackhaugh, Clovenfords.
2nd	No. 949	Cameron, R. C., Greenlawdean, Berwickshire.
3rd	No. 950	Cameron, R. C., Greenlawdean, Berwickshire.

CLASS 123. EWE, above one Shear.—PREMIUMS, £10, £5, and £2.

1st	No. 956	M'Laren, William, Fairnington, Roxburgh.
2nd	No. 953	Dodds, William, Clarilaw, Lilliesleaf, Melrose.
3rd	No. 955	M'Laren, William, Fairnington, Roxburgh.
V	No. 954	Dodds, William, Clarilaw, Lilliesleaf, Melrose.
H	No. 952	Cochrane, Lieut.-Colonel Lord, of Cults, Crawford Priory, Springfield, Fife.

CLASS 124. SHEARLING EWE or GIMMER.—PREMIUMS, £10, £5, and £2.

1st	No. 961	M'Laren, William, Fairnington, Roxburgh.
2nd	No. 962	M'Laren, William, Fairnington, Roxburgh.
3rd	No. 959	Dodds, William, Clarilaw, Lilliesleaf, Melrose.
V	No. 960	M'Laren, William, Fairnington, Roxburgh.
H	No. 958	Dodds, William, Clarilaw, Lilliesleaf, Melrose.
C	No. 957	Cochrane, Lieut.-Colonel Lord, of Cults, Crawford Priory, Springfield, Fife.

CLASS 125. EWE LAMB.—PREMIUMS, £5, £3, and £2.

1st	No. 964	Dodds, William, Clarilaw, Lilliesleaf, Melrose.
2nd	No. 965	Dodds, William, Clarilaw, Lilliesleaf, Melrose.
3rd	No. 966	M'Laren, William, Fairnington, Roxburgh.
V	No. 963	Cochrane, Lieut.-Colonel Lord, of Cults, Crawford Priory, Springfield, Fife.

OXFORD DOWN.

DUKE OF YORK CHAMPION SILVER MEDAL
for best Oxford Down Sheep.

No. 972 Templeton, T. & M., Sandyknowe, Kelso.

Reserve—No. 974 Templeton, T. & M., Sandyknowe, Kelso.

Scottish Oxford Down Sheep-Breeders' Challenge Bowl, value £50, *for the best Oxford Down Animal bred in Scotland.* Given by Oxford Down Sheep-Breeders' Association.

No. 972 Templeton, T. & M., Sandyknowe, Kelso.

CLASS 126. SHEARLING TUP.—PREMIUMS, £8, £5, and £3.

1st	No. 972	Templeton, T. & M., Sandyknowe, Kelso.
2nd	No. 974	Templeton, T. & M., Sandyknowe, Kelso.
3rd	No. 973	Templeton, T. & M., Sandyknowe, Kelso.
V	No. 970	Hutcheon, W. M., Ordley, Auchterless.
H	No. 971	Lawson, William H., Frithfield, Anstruther, "Ladas' (12,453).
C	No. 968	Bell, John, Balbuthie, Kilconquhar.
C	No. 969	Bell, John, Balbuthie, Kilconquhar.

CLASS 127. SHEARLING EWE or GIMMER.—PREMIUMS, £8, £5, and £3.

1st	No. 985	Templeton, T. & M., Sandyknowe, Kelso.
2nd	No. 984	Templeton, T. & M., Sandyknowe, Kelso.
3rd	No. 983	Templeton, T. & M., Sandyknowe, Kelso.
V	No. 978	Hutcheon, W. M., Ordley, Auchterless.
H	No. 977	Hutcheon, W. M., Ordley, Auchterless, "Jess."
C	No. 975	Bell, John, Balbuthie, Kilconquhar.
C	No. 976	Bell, John, Balbuthie, Kilconquhar.
C	No. 986	Watson, Alexander P., Allathan, Udny, Aberdeenshire.

CLASS 128. TUP LAMB.—PREMIUMS, £8, £5, and £3.

1st	No. 996	Templeton, T. & M., Sandyknowe, Kelso.
2nd	No. 994	Lawson, William H., Frithfield, Anstruther.
3rd	No. 989	Forrest, Robert, Preston, Duns.
V	No. 997	Templeton, T. & M., Sandyknowe, Kelso.
H	No. 992	Hutcheon, W. M., Ordley, Auchterless.
C	No. 988	Birnie, A., Wellbank, Peterhead.
C	No. 990	Forrest, Robert, Preston, Duns.
C	No. 993	Lawson, William H., Frithfield, Anstruther.
C	No. 995	Templeton, T. & M., Sandyknowe, Kelso.

CLASS 129. EWE LAMB.—PREMIUMS, £5, £3, and £2.

1st	No. 1003	Templeton, T. & M., Sandyknowe, Kelso.
2nd	No. 1004	Templeton, T. & M., Sandyknowe, Kelso.
3rd	No. 1001	Lawson, William H., Frithfield, Anstruther.
V	No. 1002	Lawson, William H., Frithfield, Anstruther.
H	No. 998	Bell, John, Balbuthie, Kilconquhar.
C	No. 999	Birnie, A., Wellbank, Peterhead.
C	No. 1000	Hutcheon, W. M., Ordley, Auchterless.
C	No. 1005	Templeton, T. & M., Sandyknowe, Kelso.

SUFFOLK.

DUKE OF YORK CHAMPION SILVER MEDAL for best Suffolk Sheep.

No. 1023 Prince-Smith, Sir Prince, Bart., Southburn House, Driffield, East Yorkshire.

Reserve—No. 1038 Prince-Smith, Sir Prince, Bart., Southburn House, Driffield, East Yorkshire.

Silver Challenge Cup, value £15, offered by the Suffolk Sheep Society *for best Group of Suffolk Sheep, consisting of one Tup, one shear and over, one Shearling Ewe or Gimmer, one Tup Lamb and one Ewe Lamb, the Females and Tup Lamb must be bred by Exhibitor—drawn from Classes* 130 *to* 133. Given by the Suffolk Sheep Society.

Nos. 1009, 1023, 1038, 1056 Prince-Smith, Sir Prince, Bart., Southburn House, Driffield, East Yorkshire.

CLASS 130. TUP, one Shear and over.—PREMIUMS, £8, £5, and £3.

1st	No. 1009	Prince-Smith, Sir Prince, Bart., Southburn House, Driffield, East Yorkshire.
2nd	No. 1014	Whitton, R. & W., East Nevay, Eassie, Angus, " Ashbocking Warrior."
3rd	No. 1013	Ross-Taylor, J. P., Mungoswalls, Duns.
V	No. 1012	Rintoul, William, Pratis, Leven.
H	No. 1015	Whitton, R. & W., East Nevay, Eassie, Angus, " East Nevay Gold Standard 2nd."
C	No. 1011	Rintoul, William, Pratis, Leven.

CLASS 131. SHEARLING EWE or GIMMER.—PREMIUMS, £8, £5, and £3.

1st	No. 1023	Prince-Smith, Sir Prince, Bart., Southburn House, Driffield, East Yorkshire.
2nd	No. 1024	Prince-Smith, Sir Prince, Bart., Southburn House, Driffield, East Yorkshire.
3rd	No. 1027	Whitton, R. & W., East Nevay, Eassie, Angus.
V	No. 1026	Ross-Taylor, J. P., Mungoswalls, Duns.
H	No. 1016	Barr, Samuel, Nottylees, Kelso.
C	No. 1017	Barr, Samuel, Nottylees, Kelso.

CLASS 132. TUP LAMB.—PREMIUMS, £8, £5, and £3.

1st	No. 1038	Prince-Smith, Sir Prince, Bart., Southburn House, Driffield, East Yorkshire.
2nd	No. 1048	Whitton, R. & W., East Nevay, Eassie, Angus.
3rd	No. 1042	Ross-Taylor, J. P., Mungoswalls, Duns.
V	No. 1039	Prince-Smith, Sir Prince, Bart., Southburn House, Driffield, East Yorkshire.
H	No. 1043	Ross-Taylor, J. P., Mungoswalls, Duns.
C	No. 1031	Duncan, Commander J. A., Parkhill, Arbroath.
C	No. 1046	Whitton, R. & W., East Nevay, Eassie, Angus.
C	No. 1037	Johnston, W. B., Airneyfoul, Glamis.
C	No. 1047	Whitton, R. & W., East Nevay, Eassie, Angus.

CLASS 133. EWE LAMB.—PREMIUMS, £5, £3, and £2.

1st	No. 1056	Prince-Smith, Sir Prince, Bart., Southburn House, Driffield, East Yorkshire.
2nd	No. 1060	Ross-Taylor, J. P., Mungoswalls, Duns.
3rd	No. 1052	Duncan, Commander J. A., Parkhill, Arbroath.
V	No. 1062	Whitton, R. & W., East Nevay, Eassie, Angus.
H	No. 1053	Duncan, Commander J. A., Parkhill, Arbroath.
C	No. 1057	Prince-Smith, Sir Prince, Bart., Southburn House, Driffield, East Yorkshire.
C	No. 1063	Whitton, R. & W., East Nevay, Eassie, Angus.
C	No. 1051	Duncan, Commander J. A., Parkhill, Arbroath.

SHROPSHIRE.

CLASS 134.
CLASS 135. } Cancelled owing to insufficient entries.

DORSET HORN.

DUKE OF YORK CHAMPION SILVER MEDAL
for best Dorset Horn Sheep.

No. 1066 Elgin and Kincardine, The Earl of, C.M.G., Broomhall, Dunfermline.
Reserve—No. 1074 Elgin and Kincardine, The Earl of, C.M.G., Broomhall, Dunfermline, 451 Ewe.

CLASS 136. TUP, any age.—PREMIUMS, £6, £4, and £2.

1st No. 1066 Elgin and Kincardine, The Earl of, C.M.G., Broomhall, Dunfermline.
2nd No. 1067 Elgin and Kincardine, The Earl of, C.M.G., Broomhall, Dunfermline.
3rd No. 1064 Bruce, Lord, Broomhall, Dunfermline, " No. 11 " (6485).

CLASS 137. EWE or GIMMER.—PREMIUMS, £5, £3, and £2.

1st No. 1072 Elgin and Kincardine, The Earl of, C.M.G., Broomhall, Dunfermline, 451 Ewe.
2nd No. 1071 Elgin and Kincardine, The Earl of, C.M.G., Broomhall, Dunfermline, 451 Ewe.
3rd No. 1068 Bruce, Lord, Broomhall, Dunfermline, 451 Ewe.

EXTRA STOCK.

The following were awarded Silver Medals :—

No. 1073 Elgin and Kincardine, The Earl of, C.M.G., Broomhall, Dunfermline, 451 Ewe.
No. 1074 Elgin and Kincardine, The Earl of, C.M.G., Broomhall, Dunfermline, 451 Ewe.

FAT SHEEP.

DUKE OF YORK CHAMPION SILVER MEDAL
for best pen of Fat Sheep.

No. 1080 Whitton, R. & W., East Nevay, Eassie, Angus (Suffolk).

Reserve—No. 1077 Elgin and Kincardine, The Earl of, C.M.G., Broomhall, Dunfermline (Dorset Horn).

CLASS 138. THREE FAT LAMBS, any Breed or Cross, dropped in the year of the Show.—PREMIUMS, £5, £3, and £2.

1st No. 1080 Whitton, R. & W., East Nevay, Eassie, Angus (Suffolk).
2nd No. 1077 Elgin and Kincardine, The Earl of, C.M.G., Broomhall, Dunfermline (Dorset Horn).
3rd No. 1075 Bruce, Lord, Broomhall, Dunfermline (Dorset Down).
V No. 1076 Cochrane, Lieut.-Colonel Lord, of Cults, Crawford Priory, Springfield, Fife (Dorset Horn).
H No. 1078 Johnston, W. B., Airneyfoul, Glamis (Suffolk).
C No. 1079 Lawson, William H., Frithfield, Anstruther (Oxford Down).

GOATS

DUKE OF YORK CHAMPION SILVER MEDAL
for best Animal in the Goat Classes.

No. 1088 Forteviot, Margaret, Lady, Galloway House, Garlieston, Wigtownshire (British Alpine), " Dupplin Eschscholtzia " (BA 169).

Reserve—No. 1087 Forteviot, Margaret, Lady, Galloway House, Garlieston, Wigtownshire (British Toggenburg), " Dupplin Camellia " (9671).

The Competition for Goats is recognised by the British Goat Society, Roydon Road, Diss, Norfolk, which will give Challenge Certificates (qualifying for a Championship) :—

For the best Female Goat over two years that has borne a kid.

No. 1088 Forteviot, Margaret, Lady, Galloway House, Garlieston, Wigtownshire (British Alpine), " Dupplin Eschscholtzia " (BA 169).

For the best dual purpose Goat over two years that has borne a kid.

No. 1089 Blair, Mrs W. E., Blairholm Goat and Poultry Farm, Kirknewton, Midlothian (British Saanen), " Leilia " (BS 292).

A Bronze Medal for the best Female exhibit in Classes 139 *to* 144 *inclusive.*

No. 1088 Forteviot, Margaret, Lady, Galloway House, Garlieston, Wigfownshire (British Alpine), " Dupplin Eschscholtzia " (BA 169).

Challenge Cup, value 20 Guineas, *for the best Female Goat in the Show.* Given by the late Lord Dewar.

No. 1088 Forteviot, Margaret, Lady, Galloway House, Garlieston, Wigtownshire (British Alpine), " Dupplin Eschscholtzia " (BA 169).

Challenge Cup, value £10, *for best Female Anglo-Nubian Goat over two years old, in Milk, entered in the Anglo-Nubian section of the Herd-Book, " Extra Stock " eligible to compete.* Given by Mrs S. Macdonald.

(No entry.)

CLASS 139. FEMALE GOAT, Toggenburg, British Toggenburg, or British Alpine, in Milk.—PREMIUMS, £3, £2, and £1.

1st No. 1088 Forteviot, Margaret, Lady, Galloway House, Garlieston, Wigtownshire (British Alpine), " Dupplin Eschscholtzia " (BA 169).

2nd No. 1087 Forteviot, Margaret, Lady, Galloway House, Garlieston, Wigtownshire (British Toggenburg), " Dupplin Camellia " (9671).

CLASS 140. FEMALE GOAT, Saanen or British Saanen, in Milk.—PREMIUMS, £3, £2, and £1.

1st No. 1089 Blair, Mrs W. E., Blairholm Goat and Poultry Farm, Kirknewton, Midlothian (British Saanen), " Leilia " (BS 292).

CLASS 141. FEMALE GOAT, any other variety, in Milk.—PREMIUMS, £3, £2, and £1.

1st No. 1091 Forteviot, Margaret, Lady, Galloway House, Garlieston, Wigtownshire (British), " Dupplin Buttercup " (9115).

2nd No. 1092 Forteviot, Margaret, Lady, Galloway House, Garlieston, Wigtownshire (British), " Dupplin Curler " (9679).

CLASS 142. GOATLING, Toggenburg, British Toggenburg, or British Alpine, over one but not exceeding two years.—PREMIUMS, £3, £2, and £1.

1st No. 1094 Forteviot, Margaret, Lady, Galloway House, Garlieston, Wigtownshire (British Alpine), " Dupplin Forget-me-not " (10,531).

2nd No. 1095 Forteviot, Margaret, Lady, Galloway House, Garlieston, Wigtownshire (British Alpine), " Dupplin Flamingo " (10,535).

CLASS 143. GOATLING, any other Variety, over one but not exceeding two years.—PREMIUMS, £3, £2, and £1.

(No entry.)

CLASS 144. FEMALE KID, any Variety, not exceeding one year.—PREMIUMS, £3, £2, and £1.

1st No. 1100 Forteviot, Margaret, Lady, Galloway House, Garlieston, Wigtownshire (British), " Dupplin Genista " (10,916).

2nd No. 1103 Swan, Miss Elinor, Harmony House, Eden Lane, Churchhill, Edinburgh (British), " Dinah of Swanston " (10,945).

3rd No. 1098 Blair, Mrs W. E., Blairholm Goat and Poultry Farm, Kirknewton, Midlothian (British Saanen), " Foulden Dainty " (10,969).

V No. 1097 Blair, Mrs W. E., Blairholm Goat and Poultry Farm, Kirknewton, Midlothian (British Saanen), " Foulden Joy " (10,963).

H No. 1099 Cameron, Mrs Allan, Darris, Dores, Inverness (British Toggenburg), " Darris Erica."

C No. 1101 Forteviot, Margaret, Lady, Galloway House, Garlieston, Wigtownshire (British), " Dupplin Gentian " (10,917).

CLASS 145. MALE KID, any Variety, not exceeding one year.—PREMIUMS, £3, £2, and £1.

1st No. 1106 Forteviot, Margaret, Lady, Galloway House, Garlieston, Wigtownshire (British Alpine), "Dupplin Gean" (10,919).
2nd No. 1105 Blair, Mrs W. E., Blairholm Goat and Poultry Farm, Kirknewton, Midlothian (British Saanen), "Foulden Dinkie" (10,970).
3rd No. 1104 Blair, Mrs W. E., Blairholm Goat and Poultry Farm, Kirknewton, Midlothian (British Saanen), "Foulden Boy" (10,962).
V No. 1108 Jeans, John, Ley Lodge, Kintore (British Saanen), "Dastur" (10,956).

CLASS 146. MILKING COMPETITION, for quality, open to Classes 139 to 141.—PREMIUMS, £3, £2, and £1.

1st No. 1089 Blair, Mrs W. E., Blairholm Goat and Poultry Farm, Kirknewton, Midlothian (British Saanen), "Leilia" (BS 292).
2nd No. 1092 Forteviot, Margaret, Lady, Galloway House, Garlieston, Wigtownshire (British), "Dupplin Curler" (9679).
3rd No. 1091 Forteviot, Margaret, Lady, Galloway House, Garlieston, Wigtownshire (British), "Dupplin Buttercup" (9115).

CLASS 147. MILKING COMPETITION, for quantity, open to Classes 139 to 141.—PREMIUMS, £3, £2, and £1.

1st No. 1089 Blair, Mrs W. E., Blairholm Goat and Poultry Farm, Kirknewton, Midlothian (British Saanen), "Leilia" (BS 292).
2nd No. 1092 Forteviot, Margaret, Lady, Galloway House, Garlieston, Wigtownshire (British), "Dupplin Curler" (9679).
3rd No. 1091 Forteviot, Margaret, Lady, Galloway House, Garlieston, Wigtownshire (British), "Dupplin Buttercup" (9115).

PIGS

LARGE WHITE.

DUKE OF YORK CHAMPION SILVER MEDAL
for best Large White Pig.

No. 1131 Cowper, John E. B., Gogar Mains, Corstorphine, Edinburgh, "Hardwick Primula" (205,304).

Reserve—No. 1117 Gellan, Edward B., Halbeath Pig Farm, Kingseat, Dunfermline, "Halbeath Jay 9th" (80,277).

Dundee Citizens' Perpetual Silver Challenge Cup, value about £50, *for the best Large White Pig, "Extra Stock" eligible to compete.* This Cup has been presented by the Citizens of Dundee to commemorate the holding of the Society's Annual Show at Dundee.

No. 1131 Cowper, John E. B., Gogar Mains, Corstorphine, Edinburgh, "Hardwick Primula" (205,304).

Gold Medal, value £5 (or cash), *for best Large White Boar.* Given by the National Pig-Breeders' Association.

No. 1117 Gellan, Edward B., Halbeath Pig Farm, Kingseat, Dunfermline, "Halbeath Jay 9th" (80,277).

CLASS 148. BOAR, born before 1932.—PREMIUMS, £8, £4, and £2.

1st No. 1112 Jones, Messrs, Dunmore Park, Larbert, "Gogar Banner" (76,461).
2nd No. 1110 Cochrane, Lieut.-Colonel Lord, of Cults, Crawford Priory, Springfield, Fife, "Halbeath Jay 8th" (76,539).
3rd No. 1113 Royal Edinburgh Hospital, per William Cameron Winter, West House, Morningside Place, Edinburgh, "Tollerton Major 2nd" (81,495).
V No. 1111 Cox, James Ernest, Methven Castle, Methven, "Halbeath King Edward" (76,541).
H No. 1109 Cochrane, Lieut.-Colonel Lord, of Cults, Crawford Priory, Springfield, Fife, "Gogar Prince George" (71,683).

CLASS 149. BOAR, born in 1932 before 1st July.—PREMIUMS, £8, £4, and £2.

1st No. 1117 Gellan, Edward B., Halbeath Pig Farm, Kingseat, Dunfermline, "Halbeath Jay 9th" (80,277).
2nd No. 1116 Elder, A. J., City Mills, Dunfermline, "Weston Bob 16th" (81,925).
3rd No. 1115 Cowper, John E. B., Gogar Mains, Corstorphine, Edinburgh, "Tockwith Elliot" (81,447).

CLASS 150. BOAR, born in 1932 on or after 1st July.—PREMIUMS, £6, £4, and £2.

1st	No. 1119	Honeyman, R. Wemyss, Derculich, Strathtay, "Ballechin Baronet."
2nd	No. 1120	Jones, Messrs, Dunmore Park, Larbert, "Dunmore Banner 2nd."
3rd	No. 1121	Royal Edinburgh Hospital, per William Cameron Winter, West House, Morningside Place, Edinburgh, "Morningside Monarch."

CLASS 151. BOAR, born in 1933.—PREMIUMS, £6, £3, and £1.

1st	No. 1122	Cochrane, Lieut.-Colonel Lord, or Cults, Crawford Priory, Springfield, Fife (Ear No. 479).
2nd	No. 1129	Royal Edinburgh Hospital, per William Cameron Winter, West House, Morningside Place, Edinburgh, "Barfield Prince George 6th."
3rd	No. 1127	Jack, George G., Brunstane Mills, Portobello (Ear No. 193).
V	No. 1128	Leitch, Messrs, Inchstelly, Alves, Forres (Ear No. 712).
H	No. 1123	Cowper, John E. B., Gogar Mains, Corstorphine, Edinburgh, "Gogar Hope" (Ear No. 3692).
C	No. 1124	Cowper, John E. B., Gogar Mains, Corstorphine, Edinburgh, "Gogar Hope 2nd" (Ear No. 3693).
C	No. 1125	Cox, James Ernest, Methven Castle, Methven (Ear No. 290).
C	No. 1126	Gellan, Edward B., Halbeath Pig Farm, Kingseat, Dunfermline (Ear No. 372).

Gold Medal, value £5 (or cash), *for best Large White Sow.* Given by the National Pig-Breeders' Association.

No. 1131 Cowper, John E. B., Gogar Mains, Corstorphine, Edinburgh, "Hardwick Primula" (205,304).

CLASS 152. SOW, born before 1932.—PREMIUMS, £8, £4, and £2.

1st	No. 1131	Cowper, John E. B., Gogar Mains, Corstorphine, Edinburgh, "Hardwick Primula" (205,304).
2nd	No. 1133	Elder, A. J., City Mills, Dunfermline, "Spalding Baroness 22nd" (215,408).
3rd	No. 1135	Leitch, Messrs, Inchstelly, Alves, Forres, "Inchstelly Maggie 87th" (195,320).
V	No. 1132	Elder, A. J., City Mills, Dunfermline, "Touch Lady Topsie 8th" (207,800).
H	No. 1130	Cowper, John E. B., Gogar Mains, Corstorphine, Edinburgh, "Gogar Lady Belle" (189,366).
C	No. 1134	Honeyman, R. Wemyss, Derculich, Strathtay, "Halbeath Buttercup 9th" (205,088).

CLASS 153. SOW, born in 1932 before 1st July.—PREMIUMS, £8, £4, and £2.

1st	No. 1143	Royal Edinburgh Hospital, per William Cameron Winter, West House, Morningside Place, Edinburgh, "Barfield Buttercup 4th."
2nd	No. 1136	Cochrane, Lieut.-Colonel Lord, of Cults, Crawford Priory, Springfield, Fife (Ear No. 295).
3rd	No. 1140	Elder, A. J., City Mills, Dunfermline, "Spalding Superior 22nd" (215,450).
V	No. 1137	Cowper, John E. B., Gogar Mains, Corstorphine, Edinburgh, "Gogar Betty 5th" (Ear No. 3110).

H No. 1142 Royal Edinburgh Hospital, per William Cameron Winter, West House, Morningside Place, Edinburgh, " Halbeath Beauty 8th " (213,274).
C No. 1138 Cowper, John E. B., Gogar Mains, Corstorphine, Edinburgh, " Gogar Betty 6th " (Ear No. 3112).
C No. 1141 Leitch, Messrs, Inchstelly, Alves, Forres, " Inchstelly Maggie 553rd " (214,030).

CLASS 154. SOW, born in 1932 on or after 1st July.—PREMIUMS, £6, £4, and £2.

1st No. 1146 Elder, A. J., City Mills, Dunfermline (Ear No. 697).
2nd No. 1150 Royal Edinburgh Hospital, per William Cameron Winter, West House, Morningside Place, Edinburgh, " Morningside Queen."
3rd No. 1147 Gellan, Edward B., Halbeath Pig Farm, Kingseat, Dunfermline, " Halbeath Bonnie."
V No. 1148 Honeyman, R. Wemyss, Derculich, Strathtay, " Ballechin Betty " (Ear No. 18).
H No. 1144 Cowper, John E. B., Gogar Mains, Corstorphine, Edinburgh, " Gogar Lady Mollington 6th " (Ear No. 3373).
C No. 1145 Cowper, John E. B., Gogar Mains, Corstorphine, Edinburgh, " Gogar Lady Belle 12th " (Ear No. 3397).
C No. 1149 Jack, George G., Brunstane Mills, Portobello, " Sunbury Countess 15th."

CLASS 155. SOW, born in 1933.—PREMIUMS, £6, £3, and £1.

1st No. 1151 Cochrane, Lieut.-Colonel Lord, of Cults, Crawford Priory, Springfield, Fife (Ear No. 491).
2nd No. 1160 Royal Edinburgh Hospital, per William Cameron Winter, West House, Morningside Place, Edinburgh, " Barfield Queen 29th."
3rd No. 1161 Royal Edinburgh Hospital, per William Cameron Winter, West House, Morningside Place, Edinburgh, " Barfield Queen 30th."
V No. 1158 Leitch, Messrs, Inchstelly, Alves, Forres (Ear No. 714).
H No. 1152 Cowper, John E. B., Gogar Mains, Corstorphine, Edinburgh, " Gogar Anna " (Ear No. 3697).
C No. 1153 Cowper, John E. B., Gogar Mains, Corstorphine, Edinburgh, " Gogar Anna 2nd " (Ear No. 3698).
C No. 1154 Cox, James Ernest, Methven Castle, Methven (Ear No. 259).
C No. 1155 Cox, James Ernest, Methven Castle, Methven (Ear No. 261).

LARGE BLACK.

DUKE OF YORK CHAMPION SILVER MEDAL
for best Large Black Pig.

No. 1178 M'Caig & Goodchild, Foreside of Cairn, Forfar, " Yam Erica 17th " (K 62).

Reserve—1173 M'Caig & Goodchild, Foreside of Cairn, Forfar, " Yam Opal 7th " (F 1598).

Silver Challenge Cup, value 12 Guineas, *for best Large Black Boar or Sow owned by an Exhibitor resident in Scotland.* Given by Large Black Pig Society.

No. 1178 M'Caig & Goodchild, Foreside of Cairn, Forfar, " Yam Erica 17th " (K 62).

Silver Medal *for the best Large Black Boar.* Given by Large Black Pig Society.

No. 1166 Moray, Captain W. A. S. Home Drummond, of Abercairny, Crieff, "Bearford Royalist" (H 79).

CLASS 156. BOAR, born before 1933.—PREMIUMS, £8, £4, and £2.

1st No. 1166 Moray, Captain W. A. S. Home Drummond, of Abercairny, Crieff, "Bearford Royalist" (H 79).
2nd No. 1162 Adam, James, Park, Nairn, "Streetly Magic 3rd" (K 155).
3rd No. 1165 Elder, J. S., East Bearford, Haddington, "Bearford Black Boy" (K 283).
V No. 1163 Cunningham, H., Dolphinstone, Tranent, "Dolphinstone General 1st" (G 369).
H No. 1164 Elder, J. S., East Bearford, Haddington, "Pakenham Lad" (G 193).

CLASS 157. BOAR, born in 1933.—PREMIUMS, £6, £3, and £1.

1st No. 1167 Adam, James, Park, Nairn, "Pakenham Leader 2nd" (L 57).
2nd No. 1168 Elder, J. S., East Bearford, Haddington, "Bearford Bon Accord" (L 25).
3rd No. 1169 M'Caig & Goodchild, Foreside of Cairn, Forfar, "Yam Angus 4th" (L 27).

Silver Medal *for the best Large Black Sow.* Given by Large Black Pig Society.

No. 1178 M'Caig & Goodchild, Foreside of Cairn, Forfar, "Yam Erica 17th" (K 62).

CLASS 158. SOW, born before 1932.—PREMIUMS, £8, £4, and £2.

1st No. 1173 M'Caig & Goodchild, Foreside of Cairn, Forfar, "Yam Opal 7th" (F 1598).
2nd No. 1172 Elder, J. S., East Bearford, Haddington, "Treluckey Black Lady 53rd" (H 156).
3rd No. 1174 Moray, Captain W. A. S. Home Drummond, of Abercairny, Crieff, "Abercairny Corolanty 2nd" (F 1718).

CLASS 159. SOW, born in 1932.—PREMIUMS, £8, £4, and £2.

1st No. 1178 M'Caig & Goodchild, Foreside of Cairn, Forfar, "Yam Erica 17th" (K 62).
2nd No. 1179 M'Caig & Goodchild, Foreside of Cairn, Forfar, "Yam Erica 18th" (K 64).
3rd No. 1180 M'Caig & Goodchild, Foreside of Cairn, Forfar, "Yam Opal 16th" (K 1114).
V No. 1176 Duncan, Patrick, Westerton, Laurencekirk, "Westerton Marianne 1st" (K 1148).
H No. 1177 Duncan, Patrick, Westerton, Laurencekirk, "Westerton Sally 1st" (K 1150).

CLASS 160. SOW, born in 1933.—PREMIUMS, £6, £3, and £1.

1st No. 1182 Elder, J. S., East Bearford, Haddington, "Bearford Bounty" (L 62).
2nd No. 1181 Adam, James, Park, Nairn, "Pakenham Moonbeam 8th" (L 116).
3rd No. 1183 M'Caig & Goodchild, Foreside of Cairn Forfar, "Yam Opal 19th" (L 64).

POULTRY

First Premium—Twenty Shillings. Second Premium—Ten Shillings. In each Class in which there are four or more entries a Third Prize of Five Shillings may be awarded.

Champion Challenge Silver Salver, value £30, *for the best exhibit in the Poultry Classes.* Given by the late Lord Dewar.

No. 90 Lambie, Gavin, 45 Temple Hill, Troon.

CHAMPION SILVER MEDALS.

1. *Best Cock any Variety.*

No. 88 Lambie, Gavin, 45 Temple Hill, Troon.

2. *Best Hen, any Variety.*

No. 90 Lambie, Gavin, 45 Temple Hill, Troon.

3. *Best Cockerel, any Variety.*

No. 174 Hodges, William, Curfew Poultry Farm, Chertsey, Surrey.

4. *Best Pullet, any Variety.*

No. 220 Major, A. J., Ditton, Langley, Bucks.

5. *Best Waterfowl.*

No. 429 Huntly, James, & Son, Hirsel Poultry Farm, Coldstream.

6. *Best Turkey.*

No. 465 Andrew, Mrs Jessie, South Tulloford, Oldmeldrum, Aberdeen.

7. *Best Utility Bird (Classes* 94 *to* 106).

No. 355 Binnie, W., & Son, Garth House, Denny.

CLASS 1. LEGHORN—White—Cock.

1st No. 2 Binnie, W., & Son, Garth House, Denny.
2nd No. 1 Arnott, David, Jun., Easter Frew Farm, Kippen.

CLASS 2. LEGHORN—White—Hen.

1st No. 4 Binnie, W., & Son, Garth House, Denny.
2nd No. 3 Anthony, R., Euxton, Chorley, Lancashire.
V No. 5 Cook, Lawrence W., Sandyknowe, Kelso.

CLASS 3. LEGHORN—White—Cockerel.

1st No. 6 Binnie, W., & Son, Garth House, Denny.
2nd No. 7 Graham, Mrs R., Wallacetown Cottage, Gasstown, Dumfries.

CLASS 4. LEGHORN—White—Pullet.

1st No. 9 Graham, Mrs R., Wallacetown Cottage, Gasstown, Dumfries.
2nd No. 8 Binnie, W., & Son, Garth House, Denny.

CLASS 5. LEGHORN—Exchequer—Cock or Cockerel.

1st No. 10 Glencross, James H., Largo Cottage, Glencraig, Fife (Cock).

CLASS 6. LEGHORN—Exchequer—Hen or Pullet.

1st No. 11 Binnie, W., & Son, Garth House, Denny (Hen).
2nd No. 12 Glencross, James H., Largo Cottage, Glencraig, Fife (Hen).

CLASS 7. LEGHORN—Any other Colour—Cock.

1st No. 13 Anthony, R., Euxton, Chorley, Lancashire (Brown).
2nd No. 17 Scott, James, Jun., Sornhill, Galston (Brown).
3rd No. 14 Brown, Charles D., Ivybank, Kintore (Brown).
V No. 15 Forbes, William, Brown Street, Carnoustie (Brown).
H No. 18 Scott, Joseph G., Congalton, Drem (Brown).

CLASS 8. LEGHORN—Any other Colour—Hen.

1st No. 20 Anthony, R., Euxton, Chorley, Lancashire (Brown).
2nd No. 24 Mealls, David, 16 West Borland Road, Denny (Brown).
3rd No. 26 Ross, J. C., Stirling Road, Larbert (Black).
V No. 21 Belbin, C. N., Nortonthorpe Hall, Huddersfield (Black).
H No. 25 Mealls, David, 16 West Borland Road, Denny (Brown).
C No. 23 Hopkins, Alexander, 19 Bridge Street, Galston (Brown).

CLASS 9. LEGHORN—Any other Colour—Cockerel.

(None forward.)

CLASS 10. LEGHORN—Any other Colour—Pullet.

(None forward.)

CLASS 11. MINORCA—Cock.

1st No. 31 Binnie, W., & Son, Garth House, Denny.
2nd No. 30 Arnott, David, Jun., Easter Frew Farm, Kippen.
3rd No. 32 Graham, John, Kirkfield, Lanark.

CLASS 12. MINORCA—Hen.

1st No. 36 Binnie, W., & Son, Garth House, Denny.
2nd No. 38 Graham, John, Kirkfield, Lanark.
3rd No. 34 Anderson, James, Kirkhall, Ardrossan.
V No. 39 Graham, John, Kirkfield, Lanark.
H No. 41 Sandison, Alfred, Bakery, Echt.
C No. 37 Dalrymple, John, & Son, Meadowview, Leslie.

CLASS 13. MINORCA—Cockerel.

1st	No. 43	Binnie, W., & Son, Garth House, Denny.
2nd	No. 42	Arnott, David, Jun., Easter Frew Farm, Kippen.
V	No. 44	Macgregor, James Scott, Bridgend Bakery, Greenlaw.

CLASS 14. MINORCA—Pullet.

1st	No. 46	Binnie, W., & Son, Garth House, Denny.
2nd	No. 47	Graham, John, Kirkfield, Lanark.
3rd	No. 45	Arnott, David, Jun., Easter Frew Farm, Kippen.
V	No. 48	Macgregor, James Scott, Bridgend Bakery, Greenlaw.
H	No. 49	Macgregor, James Scott, Bridgend Bakery, Greenlaw.

CLASS 15. HAMBURGH—Cock.

(No entry.)

CLASS 16. HAMBURGH—Hen.

1st	No. 50	Martin, Mrs David, 14 Castlefield, Cupar.

CLASS 17. HAMBURGH—Cockerel or Pullet.

(No entry.)

CLASS 18. SCOTCH GREY—Cock.

1st	No. 51	Ramsay, William, Busbie Farm, Crosshouse, Kilmarnock.
2nd	No. 53	Young, Dr Stephen, 6 Woodside Place, Glasgow.

CLASS 19. SCOTCH GREY—Hen.

1st	No. 54	M'Morran, Alexander, 100 Main Street, Carnwath.
2nd	No. 58	Young, Dr Stephen, 6 Woodside Place, Glasgow.
3rd	No. 57	Stirling, Thomas, Graystale Farm, Stirling.
V	No. 56	Ramsay, William, Busbie Farm, Crosshouse, Kilmarnock.
H	No. 55	Ramsay, William, Busbie Farm, Crosshouse, Kilmarnock.

CLASS 20. SCOTCH GREY—Cockerel.

1st	No. 61	Young, Dr Stephen, 6 Woodside Place, Glasgow.
2nd	No. 59	Ramsay, William, Busbie Farm, Crosshouse, Kilmarnock.
V	No. 60	Young, Dr Stephen, 6 Woodside Place, Glasgow.

CLASS 21. SCOTCH GREY—Pullet.

1st	No. 62	Ramsay, William, Busbie Farm, Crosshouse, Kilmarnock.
2nd	No. 66	Young, Dr Stephen, 6 Woodside Place, Glasgow.
3rd	No. 65	Young, Dr Stephen, 6 Woodside Place, Glasgow.
V	No. 64	Stirling, Thomas, Graystale Farm, Stirling.
H	No. 63	Stirling, Thomas, Graystale Farm, Stirling.

CLASS 22. PLYMOUTH ROCK—Barred—Cock.

1st	No. 67	Anthony, R., Euxton, Chorley, Lancashire.
2nd	No. 70	Wilson, Ludovic, Thorn Farm, Dollar.
3rd	No. 68	Brown, Charles D., Ivybank, Kintore.

CLASS 23. PLYMOUTH ROCK—Barred—Hen.

1st No. 71 Anthony, R., Euxton, Chorley, Lancashire.
2nd No. 72 Brown, Charles D., Ivybank, Kintore.
3rd No. 73 Lambie, Gavin, 45 Temple Hill, Troon.
V No. 74 Wilson, Ludovic, Thorn Farm, Dollar.

CLASS 24. PLYMOUTH ROCK—Barred—Cockerel.

1st No. 75 Logan, James, Lauder Place, East Linton.

CLASS 25. PLYMOUTH ROCK—Barred—Pullet.

1st No. 76 Logan, James, Lauder Place, East Linton.

CLASS 26. PLYMOUTH ROCK—Any other Colour—Cock or Cockerel.

1st No. 84 Lambie, Gavin, 45 Temple Hill, Troon (Cock, White).
2nd No. 77 Allenby, E. W., Three Oaks, Virginia Water, Surrey (Cock, Buff).
3rd No. 78 Anthony, R., Euxton, Chorley, Lancashire (Cock, White).
V No. 79 Belbin, C. N., Nortonthorpe Hall, Huddersfield (Cock, Buff).
H No. 80 Brown, Charles D., Ivybank, Kintore (Cock, Buff).

CLASS 27. PLYMOUTH ROCK—Any other Colour—Hen or Pullet.

1st No. 85 Anthony, R., Euxton, Chorley, Lancashire (Hen, White).
2nd No. 86 Dickson, J. H., Howlets Hall, Gordon (Pullet, Buff).

CLASS 28. ORPINGTON—Black—Cock.

1st No. 88 Lambie, Gavin, 45 Temple Hill, Troon.
2nd No. 87 Belbin, C. N., Nortonthorpe Hall, Huddersfield.
V No. 89 Patton, Messrs, & Son, 12 The Crescent, Luncarty, Perth.

CLASS 29. ORPINGTON—Black—Hen.

1st No. 90 Lambie, Gavin, 45 Temple Hill, Troon.
2nd No. 91 Patton, Messrs, & Son, 12 The Crescent, Luncarty, Perth.

CLASS 30. ORPINGTON—Any other Colour—Cock.

1st No. 93 Reith, Alexander, Barbieston Cottage, Dalrymple (Buff).
2nd No. 94 Reith, Alexander, Barbieston Cottage, Dalrymple (Buff).

CLASS 31. ORPINGTON—Any other Colour—Hen.

1st No. 95 Reith, Alexander, Barbieston Cottage, Dalrymple (Buff).

CLASS 32. ORPINGTON—Any Colour—Cockerel or Pullet.

(None forward.)

CLASS 33. WYANDOTTE—Gold or Silver—Cock.

1st No. 100 Morgan, William, Balcurvie, Windygates (Gold).
2nd No. 102 Spensley, Herbert, Oaks Farm, Menston in Wharfedale (Silver).
3rd No. 101 Richardson, William, 40 Bootham Crescent, York (Gold).
V No. 97 Belbin, C. N., Nortonthorpe Hall, Huddersfield (Silver).
H No. 98 Fraser, John, Roslin, Auldearn, Nairn (Gold).
C No. 99 Glencross, James H., Largo Cottage, Glencraig, Fife (Gold).

CLASS 34. WYANDOTTE—Gold or Silver—Hen.

1st	No. 106	Spensley, Herbert, Oaks Farm, Menston in Wharfedale (Silver).
2nd	No. 105	Morgan, William, Balcurvie, Windygates (Gold).
3rd	No. 104	Hamilton, Thomas, Kirkton Kilns, Bathgate (Silver).
V	No. 103	Fraser, John, Roslin, Auldearn, Nairn (Gold).

CLASS 35. WYANDOTTE—Gold or Silver—Cockerel.

(No entry.)

CLASS 36. WYANDOTTE—Gold or Silver—Pullet.

1st	No. 107	Morgan, William, Balcurvie, Windygates (Gold).

CLASS 37. WYANDOTTE—White—Cock.

1st	No. 110	Binnie, W., & Son, Garth House, Denny.
2nd	No. 108	Anthony, R., Euxton, Chorley, Lancashire.

CLASS 38. WYANDOTTE—White—Hen.

1st	No. 114	Binnie, W., & Son, Garth House, Denny.
2nd	No. 113	Anthony, R., Euxton, Chorley, Lancashire.
V	No. 115	Graham, James, Balcathie, Arbroath.

CLASS 39. WYANDOTTE—White—Cockerel.

1st	No. 116	Anthony, R., Euxton, Chorley, Lancashire.
2nd	No. 117	Binnie, W., & Son, Garth House, Denny.
V	No. 118	Graham, James, Balcathie, Arbroath.

CLASS 40. WYANDOTTE—White—Pullet.

1st	No. 120	Binnie, W., & Son, Garth House, Denny.
2nd	No. 121	Graham, James, Balcathie, Arbroath.

CLASS 41. WYANDOTTE—Partridge—Cock or Cockerel.

1st	No. 122	Belbin, C. N., Nortonthorpe Hall, Huddersfield (Cock).

CLASS 42. WYANDOTTE—Partridge—Hen or Pullet.

1st	No. 124	Brown, Charles D., Ivybank, Kintore (Hen).

CLASS 43. WYANDOTTE—Columbian—Cock or Cockerel.

1st	No. 126	Brown, Frederick, Woodside, Grimscar, Huddersfield (Cock).
2nd	No. 128	Parker, Miss M. S., Baldernock, Milngavie (Cock).
V	No. 127	Oag, William, Clatequoy, Thurso (Cock).

CLASS 44. WYANDOTTE—Columbian—Hen or Pullet.

1st	No. 129	Brown, Frederick, Woodside, Grimscar, Huddersfield (Hen).
2nd	No. 130	Oag, William, Clatequoy, Thurso (Hen).
V	No. 131	Parker, Miss M. S., Baldernock, Milngavie (Hen).

CLASS 45. WYANDOTTE—Any other Colour—Cock or Cockerel.

1st	No. 132	Anthony, R., Euxton, Chorley, Lancashire (Cock, Black).

CLASS 46. WYANDOTTE—Any other Colour—Hen or Pullet.

1st	No. 134	Belbin, C. N., Nortonthorpe Hall, Huddersfield (Hen, Black).
2nd	No. 133	Anthony, R., Euxton, Chorley, Lancashire (Hen, Black).
3rd	No. 137	Henry, John, Kirkbride, Creetown (Hen, Barred).
V	No. 136	Hay, J. D., Glenearn Poultry Yards, Bridge of Earn (Hen, Black).

CLASS 47. RHODE ISLAND RED—Cock.

1st	No. 146	Morgan, William, Balcurvie, Windygates.
2nd	No. 139	Belbin, C. N., Nortonthorpe Hall, Huddersfield.
3rd	No. 144	Grant, John S., Tollhouse, Auchterhouse, Dundee.
V	No. 147	Reid, Alexander, South Barrwood, Kilsyth.
H	No. 141	Doig, W. L., Invergordon.
C	No. 145	Hay, J. D., Glenearn Poultry Yards, Bridge of Earn.

CLASS 48. RHODE ISLAND RED—Hen.

1st	No. 149	Brown, Charles D., Ivybank, Kintore.
2nd	No. 152	Morgan, William, Balcurvie, Windygates.
3rd	No. 148	Belbin, C. N., Nortonthorpe Hall, Huddersfield.
V	No. 153	Reid, Alexander, South Barrwood, Kilsyth.
H	No. 151	Graham, James, Balcathie, Arbroath.

CLASS 49. RHODE ISLAND RED—Cockerel.

1st	No. 156	Morgan, William, Balcurvie, Windygates.
2nd	No. 154	Brown, Charles D., Ivybank, Kintore.
V	No. 155	Graham, James, Balcathie, Arbroath.

CLASS 50. RHODE ISLAND RED—Pullet.

1st	No. 160	Morgan, William, Balcurvie, Windygates.
2nd	No. 157	Brown, Charles D., Ivybank, Kintore.
3rd	No. 159	Hamilton, Thomas, Kirkton Kilns, Bathgate.
V	No. 158	Graham, James, Balcathie, Arbroath.

CLASS 51. SUSSEX—Light—Cock.

1st	No. 161	Anthony, R., Euxton, Chorley, Lancashire.
2nd	No. 164	Morgan, William, Balcurvie, Windygates.
3rd	No. 163	Meikle, John, Camregan, Girvan.
V	No. 165	Ross, John, Ballintomb Cottage, Dulnain Bridge, Grantown-on-Spey.
H	No. 162	Fulton, H. G., Knollhead, Kettins, Coupar-Angus.

CLASS 52. SUSSEX—Light—Hen.

1st	No. 166	Anthony, R., Euxton, Chorley, Lancashire.
2nd	No. 169	Morgan, William, Balcurvie, Windygates.
3rd	No. 171	White, James, Carterhaugh Home Farm, Selkirk.
V	No. 170	Scott, Joseph G., Congalton, Drem.
H	No. 168	Hay, J. D., Glenearn Poultry Yards, Bridge of Earn.
C	No. 167	Fulton, H. G., Knollhead, Kettins, Coupar-Angus.

CLASS 53. SUSSEX—Light—Cockerel.

1st	No. 174	Hodges, William, Curfew Poultry Farm, Chertsey, Surrey.
2nd	No. 172	Anthony, R., Euxton, Chorley, Lancashire.
3rd	No. 176	White, James, Carterhaugh Home Farm, Selkirk.
V	No. 175	Morgan, William, Balcurvie, Windygates.

CLASS 54. SUSSEX—Light—Pullet.

1st	No. 179	Hodges, William, Curfew Poultry Farm, Chertsey, Surrey.
2nd	No. 177	Anthony, R., Euxton, Chorley, Lancashire.
3rd	No. 181	White, James, Carterhaugh Home Farm, Selkirk.
V	No. 180	Scott, Joseph G., Congalton, Drem.

CLASS 55. SUSSEX—Any other Variety—Cock.

1st	No. 182	Anthony, R., Euxton, Chorley, Lancashire (Speckled).

CLASS 56. SUSSEX—Any other Variety—Hen.

1st	No. 183	Anthony, R., Euxton, Chorley, Lancashire (Speckled).

CLASS 57. SUSSEX—Any other Variety—Cockerel.

1st	No. 184	Anthony, R., Euxton, Chorley, Lancashire (Speckled).
2nd	No. 186	Henry, John, Kirkbride, Creetown (Speckled).
V	No. 185	Hamilton, Thomas, Kirkton Kilns, Bathgate (Speckled).

CLASS 58. SUSSEX—Any other Variety—Pullet.

1st	No. 187	Anthony, R., Euxton, Chorley, Lancashire (Speckled).
2nd	No. 188	Hamilton, Thomas, Kirkton Kilns, Bathgate (Speckled).

CLASS 59. DORKING—Coloured—Cock.

1st	No. 191	Meikle, John, Camregan, Girvan.

CLASS 60. DORKING—Coloured—Hen.

1st	No. 192	Aitkenhead, Charles, Carr House Farm, New Seaham.
2nd	No. 193	Major, A. J., Ditton, Langley, Bucks.
3rd	No. 195	Meikle, John, Camregan, Girvan.
V	No. 194	Major, A. J., Ditton, Langley, Bucks.

CLASS 61. DORKING—Coloured—Cockerel.

1st	No. 198	Major, A. J., Ditton, Langley, Bucks.
2nd	No. 197	Major, A. J., Ditton, Langley, Bucks.

CLASS 62. DORKING—Coloured—Pullet.

1st	No. 200	Major, A. J., Ditton, Langley, Bucks.
2nd	No. 199	Major, A. J., Ditton, Langley, Bucks.
V	No. 201	Meikle, John, Camregan, Girvan.

CLASS 63. DORKING—Silver Grey—Cock.

1st	No. 203	Bryce, William, Snaigow, Murthly.
2nd	No. 206	Meehie, John, Upper Greens, Auchtermuchty.
3rd	No. 207	Meikle, John, Camregan, Girvan.
V	No. 205	Major, A. J., Ditton, Langley, Bucks.
H	No. 204	Catto, Adam, Poultry Yards, New Machar.

CLASS 64. DORKING—Silver Grey—Hen.

1st	No. 213	Walker, John, Skinners Steps, Cupar.
2nd	No. 210	Major, A. J., Ditton, Langley, Bucks.
3rd	No. 211	Mechie, John, Upper Greens, Auchtermuchty.
V	No. 212	Meikle, John, Camregan, Girvan.
H	No. 209	Aitkenhead, Charles, Carr House Farm, New Seaham.

CLASS 65. DORKING—Silver Grey—Cockerel.

1st	No. 215	Major, A. J., Ditton, Langley, Bucks.
2nd	No. 217	Stewart, Duncan M., Bridge House, Broughty Ferry.
3rd	No. 216	Major, A. J., Ditton, Langley, Bucks.

CLASS 66. DORKING—Silver Grey—Pullet.

1st	No. 220	Major, A. J., Ditton, Langley, Bucks.
2nd	No. 221	Major, A. J., Ditton, Langley, Bucks.
3rd	No. 222	Stewart, Duncan M., Bridge House, Broughty Ferry.
V	No. 219	Catto, Adam, Poultry Yards, New Machar.

CLASS 67. SCOTS DUMPY—Cock.

1st	No. 224	Kerr, J. E., of Harviestoun, Dollar.
2nd	No. 223	Kerr, J. E., of Harviestoun, Dollar.
3rd	No. 225	Kerr, J. E., of Harviestoun, Dollar.
V	No. 226	Major, A. J., Ditton, Langley, Bucks.

CLASS 68. SCOTS DUMPY—Hen.

1st	No. 228	Kerr, J. E., of Harviestoun, Dollar.
2nd	No. 229	Kerr, J. E., of Harviestoun, Dollar.
3rd	No. 227	Kerr, J. E., of Harviestoun, Dollar.
V	No. 230	Major, A. J., Ditton, Langley, Bucks.

CLASS 69. SCOTS DUMPY—Cockerel or Pullet.

1st	No. 231	Kerr, J. E., of Harviestoun, Dollar.
2nd	No. 232	Kerr, J. E., of Harviestoun, Dollar.

CLASS 70. BARNEVELDER—Cock.

1st	No. 234	Belbin, C. N., Nortonthorpe Hall, Huddersfield.
2nd	No. 235	Binnie, W., & Son, Garth House, Denny.
3rd	No. 236	Cameron, Mrs Allan, Darris, Dores, Inverness.
V	No. 238	Scott, Joseph G., Congalton, Drem.
H	No. 237	Morgan, William, Balcurvie, Windygates.

CLASS 71. BARNEVELDER—Hen.

1st	No. 240	Binnie, W., & Son, Garth House, Denny.
2nd	No. 241	Morgan, William, Balcurvie, Windygates.
3rd	No. 239	Belbin, C. N., Nortonthorpe Hall, Huddersfield.
V	No. 242	Scott, Joseph G., Congalton, Drem.

CLASS 72. BARNEVELDER—Cockerel.

1st	No. 244	Binnie, W., & Son, Garth House, Denny.
2nd	No. 243	Belbin, C. N., Nortonthorpe Hall, Huddersfield.
3rd	No. 246	Stark, Peter D., Denhead of Gray, Liff, Angus.
V	No. 245	Cameron, Mrs Allan, Darris, Dores, Inverness.

CLASS 73. BARNEVELDER—Pullet.

1st	No. 248	Binnie, W., & Son, Garth House, Denny.
2nd	No. 247	Belbin, C. N., Nortonthorpe Hall, Huddersfield.
V	No. 249	Scott, Joseph G., Congalton, Drem.

CLASS 74. INDIAN GAME—Cock.

1st	No. 250	Belbin, C. N., Nortonthorpe Hall, Huddersfield.

CLASS 75. INDIAN GAME—Hen.

1st	No. 251	Belbin, C. N., Nortonthorpe Hall, Huddersfield.

CLASS 76. INDIAN GAME—Cockerel.

1st	No. 252	Belbin, C. N., Nortonthorpe Hall, Huddersfield.
2nd	No. 253	Black, William A. P., Croftfoot, Old Polmont.

CLASS 77. INDIAN GAME—Pullet.

1st	No. 254	Black, William A. P., Croftfoot, Old Polmont.

CLASS 78. OLD ENGLISH GAME—Cock.

1st	No. 257	Slater, A., The Old Vicarage, Lythe, Whitby.
2nd	No. 256	Laidler, James, 112 Glasgow Road, Paisley.
3rd	No. 255	Belbin, C. N., Nortonthorpe Hall, Huddersfield.
V	No. 258	Slater, A., The Old Vicarage, Lythe, Whitby.

CLASS 79. OLD ENGLISH GAME—Hen.

1st	No. 259	Belbin, C. N., Nortonthorpe Hall, Huddersfield.
2nd	No. 260	Laidler, James, 112 Glasgow Road, Paisley.
3rd	No. 262	Slater, A., The Old Vicarage,-Lythe, Whitby.
V	No. 261	Slater, A., The Old Vicarage, Lythe, Whitby.

CLASS 80. OLD ENGLISH GAME—Cockerel.

1st	No. 263	Belbin, C. N., Nortonthorpe Hall, Huddersfield.
2nd	No. 264	Laidler, James, 112 Glasgow Road, Paisley.

CLASS 81. OLD ENGLISH GAME—Pullet.

1st	No. 265	Belbin, C. N., Nortonthorpe Hall, Huddersfield.
2nd	No. 266	Laidler, James, 112 Glasgow Road, Paisley.

CLASS 82. BANTAM GAME—Old English—Cock.

1st	No. 271	Morgan, William, Balcurvie, Windygates.
2nd	No. 267	Belbin, C. N., Nortonthorpe Hall, Huddersfield.
3rd	No. 272	Ness, William, & Son, Rose Cottage, Kinglassie, Cardenden.
V	No. 273	Ness, William, & Son, Rose Cottage, Kinglassie, Cardenden.
H	No. 268	Belbin, C. N., Nortonthorpe Hall, Huddersfield.
C	No. 269	Fox-Brockbank, A. H., The Croft, Kirksanton, Millom, Cumberland.

CLASS 83. BANTAM GAME—Old English—Hen.

1st	No. 278	Morgan, William, Balcurvie, Windygates.
2nd	No. 274	Belbin, C. N., Nortonthorpe Hall, Huddersfield.
3rd	No. 280	Ness, William, & Son, Rose Cottage, Kinglassie, Cardenden.
V	No. 279	Ness, William, & Son, Rose Cottage, Kinglassie, Cardenden.
H	No. 275	Belbin, C. N., Nortonthorpe Hall, Huddersfield.
C	No. 276	Fox-Brockbank, A. H., The Croft, Kirksanton, Millom, Cumberland.

CLASS 84. BANTAM GAME—Modern—Cock.

1st	No. 287	Tyrie, Archibald, 34 North Street, Forfar.
2nd	No. 281	Belbin, C. N., Nortonthorpe Hall, Huddersfield.
3rd	No. 282	Coutts, William, Rosemount, Forfar.
V	No. 284	Delaney, James, & Son, Gateside, Fife.
H	No. 286	Tyrie, Archibald, 34 North Street, Forfar.
C	No. 283	Delaney, James, & Son, Gateside, Fife.

CLASS 85. BANTAM GAME—Modern—Hen.

1st	No. 289	Coutts, William, Rosemount, Forfar.
2nd	No. 292	Tyrie, Archibald, 34 North Street, Forfar.
3rd	No. 288	Belbin, C. N., Nortonthorpe Hall, Huddersfield.
V	No. 290	Delaney, James, & Son, Gateside, Fife.
H	No. 291	Sandison, Alfred, Bakery, Echt.

CLASS 86. BANTAM—Other than Game—Cock.

1st	No. 294	Belbin, C. N., Nortonthorpe Hall, Huddersfield (Pekin, Black).
2nd	No. 299	Lambie, Gavin, 45 Temple Hill, Troon (Pekin, White).
3rd	No. 298	Laidler, James, 112 Glasgow Road, Paisley (Blue Belgian).
V	No. 295	Binnie, W., & Son, Garth House, Denny (Wyandotte, Partridge).
H	No. 293	Belbin, C. N., Nortonthorpe Hall, Huddersfield (Sebright, Silver).
C	No. 301	Sandison, Alfred, Bakery, Echt (Pekin, Black).

CLASS 87. BANTAM—Other than Game—Hen.

1st	No. 304	Binnie, W., & Son, Garth House, Denny (Wyandotte, White).
2nd	No. 308	Lambie, Gavin, 45 Temple Hill, Troon (Pekin, White).
3rd	No. 307	Laidler, James, 112 Glasgow Road, Paisley (Blue Belgian).
V	No. 302	Belbin, C. N., Nortonthorpe Hall, Huddersfield (Pekin, Black).
H	No. 305	Hay, J. D., Glenearn Poultry Yards, Bridge of Earn (Light Sussex).
C	No. 310	Sandison, Alfred, Bakery, Echt (Partridge, Wyandotte).

CLASS 88. BANTAM—Any Variety—Cockerel.

1st	No. 312	Belbin, C. N., Nortonthorpe Hall, Huddersfield (Old English Game).
2nd	No. 313	Belbin, C. N., Nortonthorpe Hall, Huddersfield (Old English Game).

CLASS 89. BANTAM—Any Variety—Pullet.

1st	No. 314	Belbin, C. N., Nortonthorpe Hall, Huddersfield (Old English Game).
2nd	No. 316	Delaney, James, & Son, Gateside, Fife (Modern Game).
V	No. 315	Belbin, C. N., Nortonthorpe Hall, Huddersfield (Old English Game).

CLASS 90. ANY OTHER RECOGNISED BREED OF POULTRY —Cock.

1st	No. 327	Scott, James, Jun., Sornhill, Galston (Langshan).
2nd	No. 325	Martin, Mrs David, 14 Castlefield, Cupar (Brahma).
3rd	No. 326	Miller, Mrs Violet, The Grange, Muckhart, Dollar (Jersey Giant).
V	No. 319	Fox-Brockbank, A. H., The Croft, Kirksanton, Millom, Cumberland (Welsummer).
H	No. 318	Belbin, C. N., Nortonthorpe Hall, Huddersfield (Croad Langshan).
C	No. 317	Anthony, R., Euxton, Chorley, Lancashire (Brahma).
C	No. 323	Laidler, James, 112 Glasgow Road, Paisley (Jersey Giant).
C	No. 324	M'Vicar, Daniel, Burnside Cottage, Lennoxtown (Buff Poland).

CLASS 91. ANY OTHER RECOGNISED BREED OF POULTRY —Hen.

1st	No. 328	Anthony, R., Euxton, Chorley, Lancashire (Buff Cochin).
2nd	No. 329	Belbin, C. N., Nortonthorpe Hall, Huddersfield (Jubilee Indian Game).
3rd	No. 331	Fox-Brockbank, A. H., The Croft, Kirksanton, Millom, Cumberland (Welsummer).
V	No. 336	Johnstone, D., & Son, Milton Road, Windygates (Buff Cochin).
H	No. 337	Laidler, James, 112 Glasgow Road, Paisley (Jersey Giant).
C	No. 334	Hay, J. D., Glenearn Poultry Yards, Bridge of Earn (Silkie).
C	No. 338	M'Vicar, Daniel, Burnside Cottage, Lennoxtown (Buff Poland).
C	No. 339	Martin, Mrs David, 14 Castlefield, Cupar (Brahma).

CLASS 92. ANY OTHER RECOGNISED BREED OF POULTRY —Cockerel.

1st	No. 341	Fox-Brockbank, A. H., The Croft, Kirksanton, Millom, Cumberland (Welsummer).

CLASS 93. ANY OTHER RECOGNISED BREED OF POULTRY —Pullet.

1st	No. 347	Laidler, James, 112 Glasgow Road, Paisley (Langshan).
2nd	No. 344	Anthony, R., Euxton, Chorley, Lancashire (Langshan, Black).
3rd	No. 345	Fox-Brockbank, A. H., The Croft, Kirksanton, Millom, Cumberland (Welsummer).
V	No. 348	Stark, Peter D., Denhead of Gray, Liff, Angus (Welsummer).

UTILITY POULTRY.

CLASS 94. LEGHORN—Any Variety—Cock or Cockerel.

1st	No. 349	Binnie, W., & Son, Garth House, Denny (Cock, White).
2nd	No. 351	Huntly, James, & Son, Hirsel Poultry Farm, Coldstream (Cock, Black).

CLASS 95. ANY OTHER VARIETY—Light Breed—Cock or Cockerel.

1st	No. 352	Belbin, C. N., Nortonthorpe Hall, Huddersfield (Minorca, Cock).
2nd	No. 353	Binnie, W., & Son, Garth House, Denny (Minorca, Cock).

CLASS 96. WYANDOTTE—Any Colour—Cock or Cockerel.

1st	No. 355	Binnie, W., & Son, Garth House, Denny (Cock, White).
2nd	No. 357	Hay, J. D., Glenearn Poultry Yards, Bridge of Earn (Cock, White).
3rd	No. 356	Glencross, James H., Largo Cottage, Glencraig, Fife (Cock, White).
V	No. 358	Young, Miss Norah L., West Kinnochtry, Coupar-Angus (Cockerel, White).

CLASS 97. ANY OTHER VARIETY—Heavy Breed—Cock or Cockerel.

1st	No. 364	Morgan, William, Balcurvie, Windygates (Light Sussex, Cock.)
2nd	No. 359	Belbin, C. N., Nortonthorpe Hall, Huddersfield (Plymouth Rock, Buff Cock).
3rd	No. 360	Brown, Charles D., Ivybank, Kintore (Rhode Island Red, Cock).
V	No. 367	Wilson, Ludovic, Thorn Farm, Dollar (Plymouth Rock, Barred Cock).
H	No. 362	Hay, J. D., Glenearn Poultry Yards, Bridge of Earn (Light Sussex, Cock).
C	No. 361	Glencross, James H., Largo Cottage, Glencraig, Fife (Plymouth Rock, Buff Cock).
C	No. 365	Oag, William, Clatequoy, Thurso (Jersey Black Giant, Cock).

CLASS 98. LEGHORN—White—Hen or Pullet.

1st	No. 368	Binnie, W., & Son, Garth House, Denny (Hen).
2nd	No. 369	Glencross, James H., Largo Cottage, Glencraig, Fife (Pullet).
V	No. 370	Smith, Alexander, 8 Orchard Place, Aberdeen (Hen).

CLASS 99. LEGHORN—Any other Colour—Hen or Pullet.

1st	No. 376	Penny, James G., Sauchie Poultry Farm, Crieff (Hen, Black).
2nd	No. 373	Belbin, C. N., Nortonthorpe Hall, Huddersfield (Hen, Black).
3rd	No. 375	Morton, David D., Balgray, Tealing, Dundee (Hen, Exchequer).
V	No. 374	Morton, David D., Balgray, Tealing, Dundee (Hen, Exchequer).
H	No. 372	Anthony, R., Euxton, Chorley, Lancashire (Hen, Black).
C	No. 371	Adams, John, 335 Strathmore Avenue, Dundee (Hen, Brown).

CLASS 100. WYANDOTTE—Any Colour—Hen or Pullet.

1st	No. 379	Binnie, W., & Son, Garth House, Denny (Hen, White).
2nd	No. 378	Belbin, C. N., Nortonthorpe Hall, Huddersfield (Hen, Black).
3rd	No. 377	Anthony, R., Euxton, Chorley, Lancashire (Hen, White).
V	No. 382	Maltman, Mrs H., Tullich Cottage, Delny (Hen, White).
H	No. 380	Graham, James, Balcathie, Arbroath (Hen, White).
C	No. 383	Young, Miss Norah L., West Kinnochtry, Coupar-Angus (Pullet, White).

CLASS 101. RHODE ISLAND RED—Hen or Pullet.

1st	No. 388	Grant, John S., Tollhouse, Auchterhouse, Dundee (Hen).
2nd	No. 389	Morgan, William, Balcurvie, Windygates (Hen).
3rd	No. 386	Brown, Charles D., Ivybank, Kintore (Hen).
V	No. 385	Adams, John, 335 Strathmore Avenue, Dundee (Hen).
H	No. 392	Stark, Peter D., Denhead of Gray, Liff, Angus (Pullet).
C	No. 387	Grant, John S., Tollhouse, Auchterhouse, Dundee (Hen).
C	No. 390	Penny, James G., Sauchie Poultry Farm, Crieff (Hen).
C	No. 391	Reid, Alexander, South Barrwood, Kilsyth (Hen).

CLASS 102. BARNEVELDER—Hen or Pullet.

1st	No. 394	Belbin, C. N., Nortonthorpe Hall, Huddersfield (Hen).
2nd	No. 395	Binnie, W., & Son, Garth House, Denny (Hen).
3rd	No. 393	Adams, John, 335 Strathmore Avenue, Dundee (Hen).
V	No. 396	Cameron, Mrs Allan, Darris, Dores, Inverness (Hen).

CLASS 103. ROCK—Any Colour—Hen or Pullet.

1st	No. 403	Wilson, Ludovic, Thorn Farm, Dollar (Hen, Barred).
2nd	No. 402	Ross, J. C., Stirling Road, Larbert, (Hen, Buff).
3rd	No. 397	Allenby, E. W., Three Oaks, Virginia Water, Surrey (Hen, Barred).
V	No. 399	Belbin, C. N., Nortonthorpe Hall, Huddersfield (Hen, Buff).
H	No. 401	Penny, James G., Sauchie Poultry Farm, Crieff (Pullet, Buff).
C	No. 398	Anthony, R., Euxton, Chorley, Lancashire (Hen, Buff).
C	No. 400	Dickson, J. H., Howlets Hall, Gordon (Hen, Buff).

CLASS 104. ANY OTHER VARIETY—Hen or Pullet.

1st	No. 411	Laidler, James, 112 Glasgow Road, Paisley (Redcap, Hen).
2nd	No. 413	Morgan, William, Balcurvie, Windygates (Light Sussex, Hen).
3rd	No. 406	Binnie, W., & Son, Garth House, Denny (Minorca, Hen).
V	No. 412	Mechie, John, Upper Greens, Auchtermuchty (Dorking, Hen).
H	No. 405	Belbin, C. N., Nortonthorpe Hall, Huddersfield (Croad Langshan, Hen).
C	No. 408	Fox-Brockbank, A. H., The Croft, Kirksanton, Millom, Cumberland (Welsummer, Hen).
C	No. 410	Grant, John S., Tollhouse, Auchterhouse, Dundee (Welsummer, Hen).
C	No. 414	Oag, William, Clatequoy, Thurso (Jersey Black Giant, Hen).

CLASS 105. ANY CROSS FOR LAYING PURPOSES—Hen.

1st	No. 420	Morton, David D., Balgray, Tealing, Dundee.
2nd	No. 418	Morgan, William, Balcurvie, Windygates.
3rd	No. 417	Belbin, C. N., Nortonthorpe Hall, Huddersfield.
V	No. 419	Morton, David D., Balgray, Tealing, Dundee.
H	No. 421	Young, Miss Norah L., West Kinnochtry, Coupar-Angus.

CLASS 106. ANY CROSS FOR LAYING PURPOSES—Pullet.

1st	No. 425	Young, Miss Norah L., West Kinnochtry, Coupar-Angus.
2nd	No. 422	Catto, Adam, Poultry Yards, New Machar.
3rd	No. 423	Dickson, J. H., Howlets Hall, Gordon.
V	No. 424	Penny, James G., Sauchie, Poultry Farm, Crieff.

CLASS 107. DUCKS—Aylesbury—Drake.

1st	No. 427	Huntly, James, & Son, Hirsel Poultry Farm, Coldstream.
2nd	No. 426	Huntly, James, & Son, Hirsel Poultry Farm, Coldstream.

CLASS 108. DUCKS—Aylesbury—Duck.

1st	No. 429	Huntly, James, & Son, Hirsel Poultry Farm, Coldstream.
2nd	No. 428	Huntly, James, & Son, Hirsel Poultry Farm, Coldstream.

CLASS 109. DUCKS—Aylesbury—Drake (Young).

1st	No. 431	Huntly, James, & Son, Hirsel Poultry Farm, Coldstream.
2nd	No. 430	Huntly, James, & Son, Hirsel Poultry Farm, Coldstream.

CLASS 110. DUCKS—Aylesbury—Duck (Young).

1st	No. 432	Huntly, James, & Son, Hirsel Poultry Farm, Coldstream.
2nd	No. 433	Huntly, James, & Son, Hirsel Poultry Farm, Coldstream.

CLASS 111. DUCKS—Orpington—Drake.

1st	No. 436	Huntly, James, & Son, Hirsel Poultry Farm, Coldstream.
2nd	No. 437	Huntly, James, & Son, Hirsel Poultry Farm, Coldstream.
3rd	No. 435	Henry, John, Kirkbride, Creetown.

CLASS 112. DUCKS—Orpington—Duck.

1st	No. 438	Huntly, James, & Son, Hirsel Poultry Farm, Coldstream.
2nd	No. 439	Huntly, James, & Son, Hirsel Poultry Farm, Coldstream.

CLASS 113. DUCKS—Orpington—Drake (Young).

1st	No. 441	Huntly, James, & Son, Hirsel Poultry Farm, Coldstream.
2nd	No. 440	Huntly, James, & Son, Hirsel Poultry Farm, Coldstream.

CLASS 114. DUCKS—Orpington—Duck (Young).

1st	No. 442	Huntly, James, & Son, Hirsel Poultry Farm, Coldstream.
2nd	No. 443	Huntly, James, & Son, Hirsel Poultry Farm, Coldstream

CLASS 115. DUCKS—Indian Runner—Drake.

1st	No. 445	Belbin, C. N., Nortonthorpe Hall, Huddersfield.
2nd	No. 444	Anthony, R., Euxton, Chorley, Lancashire.
V	No. 446	Hewetson, Rev. J., Burbage Vicarage, Buxton.

CLASS 116. DUCKS—Indian Runner—Duck.

1st	No. 449	Hewetson, Rev. J., Burbage Vicarage, Buxton.
2nd	No. 447	Anthony, R., Euxton, Chorley, Lancashire.
V	No. 448	Belbin, C. N., Nortonthorpe Hall, Huddersfield.

CLASS 117. DUCKS—Any other Variety—Drake.

1st	No. 450	Anthony, R., Euxton, Chorley, Lancashire (Rouen).
2nd	No. 452	Fox-Brockbank, A. H., The Croft, Kirksanton, Millom, Cumberland (Muscovy).
3rd	No. 454	Richardson, William, 40 Bootham Crescent, York (Cayuga).
V	No. 451	Belbin, C. N., Nortonthorpe Hall, Huddersfield (Carolina).
H	No. 453	Huntly, James, & Son, Hirsel Poultry Farm, Coldstream (Rouen).

CLASS 118. DUCKS—Any other Variety—Duck.

1st	No. 455	Anthony, R., Euxton, Chorley, Lancashire (Rouen).
2nd	No. 456	Fox-Brockbank, A. H., The Croft, Kirksanton, Millom, Cumberland (Muscovy).
3rd	No. 458	Richardson, William, 40 Bootham Crescent, York (Cayuga).
V	No. 457	Huntly, James, & Son, Hirsel Poultry Farm, Coldstream (Rouen).

CLASS 119. GEESE—Gander.

1st	No. 459	Fox-Brockbank, A. H., The Croft, Kirksanton, Millom, Cumberland.
2nd	No. 460	Hay, J. D., Glenearn Poultry Yards, Bridge of Earn.
V	No. 461	Rottenburg, F. A., of Lochlane, Crieff.

CLASS 120. GEESE—Goose.

1st	No. 463	Hay, J. D., Glenearn Poultry Yards, Bridge of Earn.
2nd	No. 464	Rottenburg, F. A., of Lochlane, Crieff.
V	No. 462	Fox-Brockbank, A. H., The Croft, Kirksanton, Millom, Cumberland.

CLASS 121. TURKEYS—Cock.

1st	No. 465	Andrew, Mrs Jessie, South Tulloford, Oldmeldrum, Aberdeen.
2nd	No. 467	Hughes, F. E., Common Farm, Langley Burrell, Chippenham, Wilts.
3rd	No. 468	Rottenburg, F. A., of Lochlane, Crieff.
V	No. 469	Rottenburg, F. A., of Lochlane, Crieff.
H	No. 466	Craig, Miss Helen, Beebykes, Falkland, Fife.
C	No. 470	Sunter, James E. C., Ben Oir, Carnock Road, Dunfermline.

CLASS 122. TURKEYS—Hen.

1st	No. 473	Rottenburg, F. A., of Lochlane, Crieff.
2nd	No. 472	Rottenburg, F. A., of Lochlane, Crieff.
V	No. 471	Andrew, Mrs Jessie, South Tulloford, Oldmeldrum, Aberdeen.

TABLE POULTRY.

CLASS 123. ANY PURE BREED—Cock.

1st	No. 474	Belbin, C. N., Nortonthorpe Hall, Huddersfield (Indian Game).
2nd	No. 479	Mechie, John, Upper Greens, Auchtermuchty (Dorking, Silver).
3rd	No. 475	Binnie, W., & Son, Garth House, Denny (Wyandotte, White).
V	No. 476	Black, William A. P., Croftfoot, Old Polmont (Indian Game).
H	No. 478	Logan, James, Lauder Place, East Linton (Australorp).
C	No. 477	Fulton, H. G., Knollhead, Kettins, Coupar-Angus (Light Sussex).

CLASS 124. ANY PURE BREED—Cockerel.

1st	No. 481	Binnie, W., & Son, Garth House, Denny (Wyandotte, White).
2nd	No. 480	Belbin, C. N., Nortonthorpe Hall, Huddersfield (Wyandotte, White).
V	No. 482	Black, William A. P., Croftfoot, Old Polmont (Sussex).

CLASS 125. ANY CROSS—Cock.

1st	No. 483	Belbin, C. N., Nortonthorpe Hall, Huddersfield (Jubilee—Sussex).
2nd	No. 484	Black, William A. P., Croftfoot, Old Polmont (Sussex—Game).

CLASS 126. ANY CROSS—Cockerel.

1st	No. 485	Belbin, C. N., Nortonthorpe Hall, Huddersfield (Indian—Sussex).
2nd	No. 486	Black, William A. P., Croftfoot, Old Polmont (Sussex—Game).

CLASS 127. ANY PURE BREED OR CROSS—Pair of Pullets.

1st	No. 488	Black, William A. P., Croftfoot, Old Polmont (Indian Game—Sussex).
2nd	No. 491	White, James, Carterhaugh Home Farm, Selkirk (Light Sussex).
3rd	No. 487	Belbin, C. N., Nortonthorpe Hall, Huddersfield (Indian Game—Sussex).
V	No. 490	Huntly, James, & Son, Hirsel Poultry Farm, Coldstream (Buff Orpington).
H	No. 489	Cameron, Mrs Allan, Darris, Dores, Inverness (Indian Game—Light Sussex).

EGGS

CLASS 1. One dozen HEN EGGS, white.—PREMIUMS, 20s., 15s., 10s.

1st	No. 16	Stratton, Miss Isa A., Meadowmore, Methven, Perthshire.
2nd	No. 1	Binnie, Miss J., Garth House, Denny.
3rd	No. 14	Shanks, Miss, Broomhill, Denny.
V	No. 12	Ramage, Mrs, Lathallan Road, Polmont, Falkirk.
H	No. 2	Black, Miss Isa, Croftfoot House, Old Polmont, Falkirk.
C	No. 3	Black, Miss Isa, Croftfoot House, Old Polmont, Falkirk.

CLASS 2. One Dozen HEN EGGS, brown or tinted.—PREMIUMS, 20s., 15s., 10s.

1st	No. 18	Anderson, William, Parkhill, Arbroath.
2nd	No. 25	Grant, Mrs, Tollhouse, Auchterhouse, Dundee.
3rd	No. 33	Stark, Peter D., Denhead of Gray, Liff, Angus.
V	No. 20	Bonnyman, J. M., Clochan, Banffshire.
H	No. 22	Graham, James, Balcathie, Arbroath.
C	No. 32	Shanks, Miss, Broomhill, Denny.

CLASS 3. One Dozen DUCK EGGS.—PREMIUMS, 20s., 15s., 10s.

1st	No. 36	Ramage, Mrs, Lathallan Road, Polmont, Falkirk.
2nd	No. 35	Monteith, Mrs H., The Island, Bothkennar, Falkirk.

CLASS 4. One Dozen TURKEY EGGS.—PREMIUMS, 20s., 15s., 10s.

1st	No. 38	Andrew, Mrs Jessie, South Tulloford, Oldmeldrum, Aberdeen.
2nd	No. 42	Duncan, Miss Ann, The Poultry Farm, Spey Bay, Morayshire.
3rd	No. 39	Andrew, Mrs Jessie, South Tulloford, Oldmeldrum, Aberdeen.
V	No. 40	Black, Miss Isa, Croftfoot House, Old Polmont, Falkirk.
H	No. 43	Sinclair, Mrs, Heathfield, Ladybank, Fife.
C	No. 41	Craig, Miss Helen, Beebykes, Falkland, Fife.

FUR-PRODUCING RABBITS

First Premium—Fifteen Shillings. Second Premium—Ten Shillings. Third Premium—Five Shillings. In each Class in which there are less than four entries the Third Prize of Five Shillings will not be awarded; where there are ten or more entries a Fourth Prize of 2s. 6d. may be awarded.

Champion Silver Medal *for best exhibit in the Rabbit Classes.*

No. 80 Graham, David M., Ravenswood, Forfar.

CLASS 1. ANGORA, over 5 months.

1st	No. 2	Stephen, Miss Mary, Garlowbank, Kirriemuir.
2nd	No. 1	Graham, Mrs E. Balfour, Levenbank, Leven.

CLASS 2. ANGORA, not exceeding 5 months.

1st	No. 7	Stephen, Miss Mary, Garlowbank, Kirriemuir.
2nd	No. 8	Tod, Andrew, 8 East Shore, Pittenweem.
3rd	No. 6	Stephen, Miss Mary, Garlowbank, Kirriemuir.
V	No. 5	Farmer, Miss M., 164 St Clair Street, Kirkcaldy.
H	No. 4	Duthie, A., 19 Derby Street, Dundee.
C	No. 3	Duthie, A., 19 Derby Street, Dundee.

CLASS 3. CHINCHILLA—Buck, over 5 months.

1st	No. 10	Graham, David M., Ravenswood, Forfar.
2nd	No. 9	Blane, John, Blanefield, High Bonnyton Road, Kilmarnock.
V	No. 11	Wardrope & Dempster, 16 Quality Street, Kirkcaldy.

CLASS 4. CHINCHILLA—Doe, over 5 months.

1st	No. 13	Blane, John, Blanefield, High Bonnyton Road, Kilmarnock.
2nd	No. 12	Aird, Robert, 10 Somerset Road, Ayr.
V	No. 14	Wardrope & Dempster, 16 Quality Street, Kirkcaldy.

CLASS 5. CHINCHILLA—Buck or Doe, not exceeding 5 months.

1st	No. 17	Wardrope & Dempster, 16 Quality Street, Kirkcaldy.
2nd	No. 16	Stephen, Miss Mary, Garlowbank, Kirriemuir.
V	No. 15	Pickard, Mrs C. L. and Dr J. N., The Cottage, Carlops.

CLASS 6. BEVEREN, over 5 months.

1st	No. 20	Garland, James, 11 Viewforth Street, Kirkcaldy.
2nd	No. 18	Duthie, A., 19 Derby Street, Dundee.
3rd	No. 19	Garland, James, 11 Viewforth Street, Kirkcaldy.
V	No. 21	Howie, Robert L., Rose Cottage, 17 Peel Street, Lochee, Dundee.

CLASS 7. BEVEREN, not exceeding 5 months.

1st	No. 24	Howie, Robert L., Rose Cottage, 17 Peel Street, Lochee, Dundee.
2nd	No. 23	Garland, James, 11 Viewforth Street, Kirkcaldy.

CLASS 8. REX, any Colour, over 5 months.

1st	No. 29	Bell, Daniel, 87 Northgate, Peebles (Grey).
2nd	No. 34	Pickard, Mrs C. L. and Dr J. N., The Cottage, Carlops.
3rd	No. 30	Graham, David M., Ravenswood, Forfar (Squirrel).
V	No. 31	Graham, David M., Ravenswood, Forfar (Chinchilla).
H	No. 32	Graham, Mrs E. Balfour, Levenbank, Leven (Grey).
C	No. 26	Arbuthnott, The Hon. Nancy, Cairnhill, Forfar (Black).
C	No. 28	Bell, Daniel, 87 Northgate, Peebles (Brown).

CLASS 9. REX, any Colour, not exceeding 5 months.

1st	No. 35	Arbuthnott, The Hon. Nancy, Cairnhill, Forfar (Sable).
2nd	No. 40	Graham, Mrs E. Balfour, Levenbank, Leven (Ermine).
3rd	No. 39	Graham, David M., Ravenswood, Forfar (Squirrel).
V	No. 36	Arbuthnott, The Hon. Nancy, Cairnhill, Forfar (Sable).
H	No. 37	Bell, Daniel, 87 Northgate, Peebles (Brown).
C	No. 38	Bell, Daniel, 87 Northgate, Peebles (Grey).
C	No. 41	Graham, Mrs E. Balfour, Levenbank, Leven (Lilac).
C	No. 42	Pickard, Mrs C. L. and Dr J. N., The Cottage, Carlops.

CLASS 10. HAVANA, over 5 months.

1st	No. 47	Taylor, John C., 89 Bridge Street, Alexandria.
2nd	No. 43	Blane, John, Blanefield, High Bonnyton Road, Kilmarnock.
3rd	No. 45	Gray, William, Millbrae Cottage, Craigston, Turriff.
V	No. 46	Robertson, T., Rowan Cottage, Anstruther.
H	No. 44	Duthie, A., 19 Derby Street, Dundee.

CLASS 11. SABLE MARTEN, over 5 months.

1st	No. 48	Gordon, Mrs, Denside House, Arbirlot, Arbroath.
2nd	No. 51	Ritchie, Ebenezer, Fairfield Street, Dundee.
3rd	No. 52	Ritchie, Ebenezer, Fairfield Street, Dundee.
V	No. 50	Ramsay, Peter, 6 Westhall Terrace, Duntrune, Dundee.
H	No. 49	Pickard, Mrs C. L. and Dr J. N., The Cottage, Carlops.

CLASS 12. SABLE MARTEN, not exceeding 5 months.

1st	No. 56	Duthie, A., 19 Derby Street, Dundee.
2nd	No. 54	Aird, Robert, 10 Somerset Road, Ayr.
3rd	No. 55	Aird, Robert, 10 Somerset Road, Ayr.
V	No. 57	Pickard, Mrs C. L. and Dr J. N., The Cottage, Carlops.

CLASS 13. SABLE SIAMESE, over 5 months.

1st	No. 58	Arbuthnott, The Hon. Nancy, Cairnhill, Forfar.
2nd	No. 61	Graham, Mrs E. Balfour, Levenbank, Leven.
3rd	No. 62	Pickard, Mrs C. L. and Dr J. N., The Cottage, Carlops.
V	No. 60	Duthie, A., 19 Derby Street, Dundee.
H	No. 59	Arbuthnott, The Hon. Nancy, Cairnhill, Forfar.

CLASS 14. SABLE SIAMESE, not exceeding 5 months.

1st	No. 65	Blane, John, Blanefield, High Bonnyton Road, Kilmarnock.
2nd	No. 63	Arbuthnott, The Hon. Nancy, Cairnhill, Forfar.
3rd	No. 66	Christie, David O., Pitmuies Mill, Friockheim.
V	No. 67	Pickard, Mrs C. L. and Dr J. N., The Cottage, Carlops.
H	No. 64	Arbuthnott, The Hon. Nancy, Cairnhill, Forfar.

CLASS 15. SQUIRREL, over 5 months.

1st	No. 69	Cessford, Miss R. L., Lugton House, Dalkeith.
2nd	No. 70	Pickard, Mrs C. L. and Dr J. N., The Cottage, Carlops.
V	No. 68	Cessford, Miss R. L., Lugton House, Dalkeith.

CLASS 16. SILVER FOX, any Colour, over 5 months.

1st	No. 74	Kilgour, Miss Peggie, St Leonard's Rabbitry, Dunfermline (Black).
2nd	No. 72	Cessford, Miss R. L., Lugton House, Dalkeith (Blue).
3rd	No. 76	Ritchie, Ebenezer, Fairfield Street, Dundee (Blue).
V	No. 73	Kilgour, Miss Peggie, St Leonard's Rabbitry, Dunfermline (Blue).
H	No. 75	Pickard, Mrs C. L. and Dr J. N., The Cottage, Carlops (Silver).

CLASS 17. SILVER FOX, any Colour, not exceeding 5 months.

1st	No. 78	Ritchie, Ebenezer, Fairfield Street, Dundee (Blue).
2nd	No. 77	Pickard, Mrs C. L. and Dr J. N., The Cottage, Carlops (Silver).

CLASS 18. Any Variety, over 5 months, for which a Class is not provided.

1st	No. 80	Graham, David M., Ravenswood, Forfar (English Black).
2nd	No. 82	Pickard, Mrs C. L. and Dr J. N., The Cottage, Carlops (Smoke Pearl).
3rd	No. 81	Lawrie, James, Springbank Rabbitry, Temple, Gorebridge (Golden Glarcot).
V	No. 79	Blane, John, Blanefield, High Bonnyton Road, Kilmarnock (Light Beige).

CLASS 19. Any Variety, not exceeding 5 months, for which a Class is not provided.

1st	No. 87	Graham, David M., Ravenswood, Forfar (English Tortoise).
2nd	No. 88	Lawrie, James, Springbank Rabbitry, Temple, Gorebridge (Golden Glarcot).
3rd	No. 89	Pickard, Mrs C. L. and Dr J. N., The Cottage, Carlops (Smoke Pearl).
V	No. 86	Graham, David M., Ravenswood, Forfar (English Black).
H	No. 85	Blane, John, Blanefield, High Bonnyton Road, Kilmarnock (Havana).
C	No. 83	Aird, Robert, 10 Somerset Road, Ayr (Albino).
C	No. 84	Aird, Robert, 10 Somerset Road, Ayr (Albino).

HONEY, &c.

OPEN CLASSES.

Silver and Bronze Medals will be awarded by the Scottish Bee-Keepers' Association *to the First and Second winners of the greatest number of points in the Classes for Honey and Wax only, calculated on the following basis: 1st Prize, 3 points; 2nd Prize, 2 points; 3rd Prize, 1 point.*

Silver Medal—Scott, George, Waterton, Ayr Road, Old Cumnock (19 points).

Bronze Medal—Duguid, Robert, Victoria Apiary, Cornhill, Banffshire (16 points).

CLASS 1. Collection of APPLIANCES suitable for a beginner's outfit for Bee-keeping. A card naming all the articles, along with the price at which they will be supplied for one year from date, to be fixed to the exhibit.—PREMIUMS, 20s., 15s., 10s.

1st	No. 1	Steele, R., & Brodie, Bee Appliance Works, Wormit.

CLASS 2. Best and most complete FRAME HIVE for general use, with any improvements. Unpainted.—PREMIUMS, 20s., 15s., 10s.

1st	No. 6	Steele, R., & Brodie, Bee Appliance Works, Wormit.
2nd	No. 2	Kelly, James H., Van Street, Glasgow.
3rd	No. 3	Kilgour, J. D., 88 St Leonard's Street, Dunfermline.
V	No. 4	Moffat, David, 65 Manse Road, Wishaw.

CLASS 3. Best and most complete HIVE. Unpainted. Price not to exceed 35s.—PREMIUMS, 20s., 15s., 10s.

1st	No. 10	Steele, R., & Brodie, Bee Appliance Works, Wormit.
2nd	No. 8	Kelly, James H., Van Street, Glasgow.
3rd	No. 9	Kelly, James H., Van Street, Glasgow.

CLASS 4. Six Sections of COMB HONEY, excluding Heather Honey.—PREMIUMS, 20s., 15s., 10s.

1st	No. 13	Duguid, Robert, Victoria Apiary, Cornhill, Banffshire.
2nd	No. 11	Allan, George C., 7 Springvale Road, Ayr.
3rd	No. 14	Kerr, James, South Corton, Ayr.
V	No. 16	Scott, George, Waterton, Ayr Road, Old Cumnock.
H	No. 12	Brown, Thomas C., Helenslea, St Ninians.
C	No. 15	Park, David C., Setonhill, Longniddry.

CLASS 5. Six Sections of HEATHER HONEY.—PREMIUMS, 20s., 15s., 10s.

1st	No. 19	Duguid, Robert, Victoria Apiary, Cornhill, Banffshire.
2nd	No. 21	Scott, George, Waterton, Ayr Road, Old Cumnock.
3rd	No. 20	Pate, Thomas, Hopefield, Milnathort.
V	No. 18	Brown, Thomas C., Helenslea, St Ninians.

CLASS 6. Six Jars of RUN or EXTRACTED LIGHT-COLOURED HONEY, approximate weight 6 lb.—PREMIUMS, 20s., 15s., 10s.

1st	No. 25	Edmonson, R., Rothay, Hale Road, Ringway, Altrincham.
2nd	No. 27	Scott, George, Waterton, Ayr Road, Old Cumnock.
3rd	No. 22	Allan, George C., 7 Springvale Road, Ayr.
V	No. 26	Lobban, Mrs W. G., Burnbank Apiary, Alford.
H	No. 24	Duguid, Robert, Victoria Apiary, Cornhill, Banffshire.
C	No. 28	Watt, Marshall K., 11 Richmond Hill Place, Aberdeen.

CLASS 7. Six Jars of RUN or EXTRACTED MEDIUM or DARK-COLOURED HONEY, excluding Heather Honey, approximate weight 6 lb.—PREMIUMS, 20s., 15s., 10s.

1st	No. 32	Edmonson, R., Rothay, Hale Road, Ringway, Altrincham.
2nd	No. 33	Scott, George, Waterton, Ayr Road, Old Cumnock.
3rd	No. 29	Allan, George C., 7 Springvale Road, Ayr.
H	No. 30	Brown, Thomas C., Helenslea, St Ninians.
C	No. 31	Duguid, Robert, Victoria Apiary, Cornhill, Banffshire.

CLASS 8. Six Jars of PRESSED HEATHER HONEY in liquid form, approximate weight 6 lb.—PREMIUMS, 20s., 15s., 10s.

1st	No. 36	Hutton, William A., 44 Whirlbut Crescent, Dunfermline.
2nd	No. 39	Thoms, A. R. B., Springbank, George Street, Coupar-Angus.
3rd	No. 40	Thoms, John, Rosslyn Cottage, Coupar-Angus.
V	No. 38	Scott, George, Waterton, Ayr Road, Old Cumnock.
H	No. 41	Watt, Marshall K., 11 Richmond Hill Place, Aberdeen.
C	No. 34	Brown, Thomas C., Helenslea, St Ninians.
C	No. 37	Pate, Thomas, Hopefield, Milnathort.

CLASS 9. Six Jars of GRANULATED HONEY, approximate weight 6 lb.—PREMIUMS, 20s., 15s., 10s.

1st	No. 44	Duguid, Robert, Victoria Apiary, Cornhill, Banffshire.
2nd	No. 46	Lobban, Mrs W. G., Burnbank Apiary, Alford.
3rd	No. 48	Melville, Robert, Union Terrace, East Newport, Fife.

CLASS 10. Two Shallow Frames of COMB HONEY for extracting purposes.—PREMIUMS, 20s., 15s., 10s.

1st	No. 58	Thoms, John, Rosslyn Cottage, Coupar-Angus.
2nd	No. 56	Scott, George, Waterton, Ayr Road, Old Cumnock.
3rd	No. 52	Hutton, William A., 44 Whirlbut Crescent, Dunfermline.
V	No. 54	Leckie, Rev. R. W., The Manse, Davidson's Mains, Edinburgh.
H	No. 53	Kilgour, J. D., 88 St Leonard's Street, Dunfermline.
C	No. 55	Park, David C., Setonhill, Longniddry.
C	No. 57	Thoms, A. R. B., Springbank, George Street, Coupar-Angus.

CLASS 11. Best display of HONEY in any form suitable for a shop window in space 4 feet by 4 feet.—Weight of Honey not to exceed 40 lb.—PREMIUMS, 60s., 30s., 20s.

1st	No. 59	Duguid, Robert, Victoria Apiary, Cornhill, Banffshire.
2nd	No. 60	Hutton, William A., 44 Whirlbut Crescent, Dunfermline.

CLASS 12. Best exhibit of not less than 1 lb. of WAX in any form.—PREMIUMS, 20s., 15s., 10s.

1st	No. 61	Brown, Thomas C., Helenslea, St Ninians.
2nd	No. 62	Duguid, Robert, Victoria Apiary, Cornhill, Banffshire.
3rd	No. 65	Munro, James D., Wester Elchies, Aberlour.
V	No. 66	Park, David C., Setonhill, Longniddry.
H	No. 68	Walkinshaw, James R., Cedar Villa, Invergowrie.

CLASS 13. Best exhibit of not less than 1 lb. of WAX made into shapes for retail trade and over-counter trade. Convenience in packing to be taken into consideration.—PREMIUMS, 20s., 15s., 10s.

1st	No. 69	Brown, Thomas C., Helenslea, St Ninians.
2nd	No. 72	Munro, James D., Wester Elchies, Aberlour.
3rd	No. 71	Melville, Robert, Union Terrace, East Newport, Fife.
V	No. 70	Duguid, Robert, Victoria Apiary, Cornhill, Banffshire.
H	No. 73	Park, David C., Setonhill, Longniddry.

CLASS 14. OBSERVATORY HIVE, with Queen and Bees—two or more frames.—PREMIUMS, 50s., 30s., 20s.

1st	No. 75	Birrell, James, 24 King Street, Perth.
2nd	No. 79	Walkinshaw, James R., Cedar Villa, Invergowrie.
3rd	No. 77	Martindale, William, Silverae, West Kilbride.
V	No. 78	O'Keeffe, Patrick, South Lodge, Arnhall, Perth Road, Dundee.

CLASS 15. OBSERVATORY HIVE, with Queen and Bees—one frame, no super.—PREMIUMS, 40s., 30s., 15s.

1st	No. 83	Fleming-Amos, Thomas, 212 Seaward Street, Glasgow.
2nd	No. 84	Ogilvie, J. & A., 369 Union Street, Aberdeen.
3rd	No. 81	Andrews, John, 11 Newton Terrace, Bucksburn, Aberdeen.
V	No. 85	Walkinshaw, James R., Cedar Villa, Invergowrie.
H	No. 80	Anderson, Dr J., 186 Forest Avenue, Aberdeen.

CONFINED TO SCOTTISH EXHIBITORS.

CLASS 16. One standard Frame of COMB HONEY for extracting purposes.—PREMIUMS, 20s., 15s., 10s.

1st	No. 87	Park, David C., Setonhill, Longniddry.
2nd	No. 86	Chalmers, William F., 27 Thistle Street, Dunfermline.

CLASS 17. Six Sections of COMB HONEY, excluding Heather Honey.—PREMIUMS, 20s., 15s., 10s.

1st	No. 88	Allan, George C., 7 Springvale Road, Ayr.
2nd	No. 95	Scott, George, Waterton, Ayr Road, Old Cumnock.
3rd	No. 96	Ure-Panton, W., Clydesdale Bank House, Milnathort.
V	No. 89	Brown, Thomas C., Helenslea, St Ninians.
H	No. 94	Park, David C., Setonhill, Longniddry.
C	No. 91	Kerr, James, South Corton, Ayr.

CLASS 18. Six Sections of HEATHER HONEY.—PREMIUMS, 30s., 20s., 10s.

1st	No. 97	Allan, George C., 7 Springvale Road, Ayr.
2nd	No. 105	Scott, George, Waterton, Ayr Road, Old Cumnock.
3rd	No. 99	Duguid, Robert, Victoria Apiary, Cornhill, Banffshire.
V	No. 98	Brown, Thomas C., Helenslea, St Ninians.
H	No. 103	Munro, James D., Wester Elchies, Aberlour.
C	No. 101	Herd, George, Jun., 4 Duthie Street, Kirriemuir.
C	No. 104	Pate, Thomas, Hopefield, Milnathort.

CLASS 19. Six Jars of RUN or EXTRACTED MEDIUM or DARK-COLOURED HONEY, excluding Heather Honey, approximate weight 6 lb.—PREMIUMS, 30s., 20s., 10s.

1st	No. 113	Scott, George, Waterton, Ayr Road, Old Cumnock.
2nd	No. 112	Park, David C., Setonhill, Longniddry.
3rd	No. 111	Melville, Robert, Union Terrace, East Newport, Fife.
V	No. 109	Duguid, Robert, Victoria Apiary, Cornhill, Banffshire.
H	No. 110	Lobban, Mrs W. G., Burnbank Apiary, Alford.
C	No. 107	Allan, George C., 7 Springvale Road, Ayr.
C	No. 108	Brown, Thomas C., Helenslea, St Ninians.

CLASS 20. Six Jars of PRESSED HEATHER HONEY in liquid form, approximate weight 6 lb.—PREMIUMS, 20s., 15s., 10s.

1st	No. 120	Pate, Thomas, Hopefield, Milnathort.
2nd	No. 121	Scott, George, Waterton, Ayr Road, Old Cumnock.
3rd	No. 117	Leitch, Hugh, The Cottage, Keithick, Coupar-Angus.
V	No. 116	Hutton, William A., 44 Whirlbut Crescent, Dunfermline.
H	No. 118	Lobban, Mrs W. G., Burnbank Apiary, Alford.
C	No. 122	Thoms, John, Rosslyn Cottage, Coupar-Angus.

CLASS 21. Six Jars of RUN or EXTRACTED LIGHT COLOURED HONEY, approximate weight 6 lb.—PREMIUMS, 30s., 20s., 10s.

1st	No. 126	Lobban, Mrs W. G., Burnbank Apiary, Alford.
2nd	No. 129	Scott, George, Waterton, Ayr Road, Old Cumnock.
3rd	No. 125	Duguid, Robert, Victoria Apiary, Cornhill, Banffshire.
V	No. 130	Watt, Marshall K., 11 Richmond Hill Place, Aberdeen.
H	No. 127	Melville, Robert, Union Terrace, East Newport, Fife.

CLASS 22. MEAD, made from Honey.—PREMIUMS, 20s., 15s., 10s.

1st	No. 132	Brown, Thomas C., Helenslea, St Ninians.
2nd	No. 133	Steele, R., & Brodie, Bee Appliance Works, Wormit.

DAIRY PRODUCE

CLASS 1. POWDERED BUTTER, not less than 3 lb.—PREMIUMS, £4, £3, £2, and £1.

1st	No. 7	Monteith, Mrs, The Island, Bothkennar, Falkirk.
2nd	No. 6	M'Lachlan, Mrs, East Crookedstone, Quarter, Hamilton.
3rd	No. 2	Fleming, Andrew, Threepland, Eaglesham.
4th	No. 12	Stratton, Miss Isa A., Meadowmore, Methven, Perthshire.

CLASS 2. FRESH BUTTER, three 1-lb. lots, to be made up in form of bricks.—PREMIUMS, £4, £3, £2, and £1.

1st	No. 22	Monteith, Mrs, The Island, Bothkennar, Falkirk.
2nd	No. 20	M'Lachlan, Mrs, East Crookedstone, Quarter, Hamilton.
3rd	No. 16	Fleming, Andrew, Threepland, Eaglesham.
4th	No. 27	Stratton, Miss Isa A., Meadowmore, Methven, Perthshire.

CLASS 3. CHEDDAR CHEESE, 56 lb. and upwards.—PREMIUMS, £9, £5, £3, £2, and £1.

1st	No. 35	M'Harg, John, Barbeth, Leswalt, Stranraer.
2nd	No. 34	M'Dowall, George, South Boreland, Dunragit.
3rd	No. 36	Milroy, James, Chapelton Dairy, Borgue, Kirkcudbright.
4th	No. 31	Cruickshanks, William, Kirkeoch, Kirkcudbright.
5th	No. 33	Hyslop, Samuel, Cairniehill, Borgue.
H	No. 37	Stevenson, John S., Balig, Ballantrae.

CLASS 4. CHEESE, 14 lb. and under.—PREMIUMS, £5, £3, £2, and £1.

1st	No. 41	M'Dowall, George, South Boreland, Dunragit.
2nd	No. 42	M'Harg, John, Barbeth, Leswalt, Stranraer.
3rd	No. 38	Cruickshanks, William, Kirkeoch, Kirkcudbright.
4th	No. 44	Stevenson, John S., Balig, Ballantrae.

RURAL INDUSTRIES

OPEN CLASSES.

SHETLAND KNITTING.

(*Exhibits made from Shetland Wool.*)

CLASS 1. FINE LACE SHAWL or SCARF.
PREMIUMS, £3, £2, and £1.

1st	No. 15	Smith, Miss Mary J., Phail, Westing, Uyeasound, Shetland (Scarf).
2nd	No. 5	Gifford, Mrs L., Lerquoy, Uyeasound, Shetland (Scarf).
3rd	No. 2	Cluness, Mrs A. T., Muness, Uyeasound, Shetland (Scarf).
V	No. 16	Smith, Miss Mary J., Phail, Westing, Uyeasound, Shetland (Shawl).
H	No. 8	Inkster, Miss Minnie, Ramnagoe, Uyeasound, Shetland (Scarf).
C	No. 7	Hunter, Mrs Agnes, Muness, Uyeasound, Shetland (Shawl).
C	No. 9	Jamieson, Miss Helen S., Gerriegarth, Baltasound, Shetland (Scarf).
C	No. 14	Robertson, Miss Mary C. S., Coutts Mill, Uyeasound, Shetland (Scarf).

CLASS 2. FINE LACE GOODS OTHER THAN ABOVE—*e.g.*, Bed-jackets, Lace Spencers, &c.—PREMIUMS, £3, £2, and £1.

1st	No. 24	Henderson, Mrs J. R., Scousburgh, Shetland (Bed-jacket).
2nd	No. 26	Hughson, Mrs M., Dandies, Uyeasound, Shetland (Child's Dress).
3rd	No. 22	Fordyce, Mrs Ann E., Annsbrae, Burrafirth, Shetland (Lace Jumper).
V	No. 33	Sutherland, Miss A. J., Mailand, Uyeasound, Shetland (Spencer).
H	No. 34	Sutherland, Mrs D., 10 Chromate Lane, Lerwick (Jumper).
C	No. 35	Sutherland, Mrs T., 10 Chromate Lane, Lerwick (Jumper).

CLASS 3. JUMPER or CARDIGAN—with or without Sleeves.—
PREMIUMS, £3, £2, and £1.

1st	No. 71	Laurenson, Miss G. B., Maywick, Bigton, Lerwick (Cardigan).
2nd	No. 41	Brown, Miss M. J., Kingland, Ollaberry, Shetland (Jumper).
3rd	No. 88	Smith, Miss Margaret J. G., Claphoull, Cunningsburgh, Shetland (Jumper).
V	No. 61	Hunter, Mrs James, Newgord, Uyeasound, Shetland (Jumper).
H	No. 86	Smith, Mrs John, Claphoull, Cunningsburgh, Shetland (Jumper).
C	No. 42	Burns, Miss Winnie, Sunnyside House, Haroldswick, Shetland (Jumper).
C	No. 66	Jarmson, Miss Jean, Lochend House, Lerwick (Jumper).
C	No. 46	Couper, Miss Robina, The Manse, Voe, Delting, Shetland (Jumper).

CLASS 4. DRESS OR COSTUME.—PREMIUMS, £3, £2, and £1.

1st	No. 101	Peterson, Miss E., Bunidale, Vidlin, Shetland (Costume).
2nd	No. 100	Leslie, Miss Joan M., North House, Virkie, Shetland (Costume).
3rd	No. 99	Jamieson, Miss B. A., Gritquoy, Uyeasound, Shetland (Costume).

CLASS 5. EXHIBITS OTHER THAN ABOVE.—PREMIUMS, £2, £1, and 10s.

1st	No. 106	Brown, Miss M. J., Kingland, Ollaberry, Shetland (Shawl).
2nd	No. 107	Georgeson, Miss Joan Barbara, Washington Cottage, Lerwick (Cushion Cover).
3rd	No. 116	Laurenson, Mrs Ursula, North Dale, Haroldswick, Shetland (Shawl).
V	No. 108	Halcrow, Miss Mary J. D., The Manse, Cunningsburgh, Shetland (Wrap).
H	No. 109	Halcrow, Miss Mary J. D., The Manse, Cunningsburgh, Shetland (Shawl).
C	No. 111	Henderson, Miss Maggie, Southerhouse, Scousburgh, Shetland (Hap).
C	No. 114	Jarmson, Miss Mary, Lochend House, Lerwick (Cap and Scarf).

TWEEDS.

CLASS 6. HARRIS or OTHER TWEED—Hand-woven.—PREMIUMS, £3, £2, and £1.

1st	No. 130	Jamieson, Henry, Ronas Voe, Ollaberry, Shetland.
2nd	No. 129	Hogg, David, 10 High Street, Earlston, Berwickshire.
3rd	No. 127	Anderson, Mrs A., Torroble, Lairg.
V	No. 132	MacGregor, Robert, Paton Street, Inverness.
H	No. 139	Ross, Mrs D. S., Lairg.
C	No. 128	Biermann, Mrs L., Blairich, Rogart.
C	No. 137	Nicolson, Mrs A. F., Mark Aith, Bixter, Shetland.

CLASS 7. TARTAN—Vegetable-dyed and Hand-woven.—PREMIUMS, £3, £2, and £1.

1st	No. 145	MacGregor, Robert, Paton Street, Inverness.
2nd	No. 146	MacKay, Mrs Donald, Tomich, Lairg.
3rd	No. 144	MacGregor, Robert, Paton Street, Inverness.
V	No. 149	Murray, Miss Margaret, Tressidy Hill, Lairg.
H	No. 148	Murray, Miss Margaret, Tressidy Hill, Lairg.

CLASS 8. CARRIAGE RUG or PLAID—Hand-woven.—PREMIUMS, £3, £2, and £1.

1st	No. 158	Ross, Mrs D. S., Lairg.
2nd	No. 153	MacGregor, Robert, Paton Street, Inverness.
3rd	No. 154	MacVean, Mrs, 15 Cairnbaan Cottages, Lochgilphead.
V	No. 151	Hogg, David, 10 High Street, Earlston, Berwickshire.
H	No. 152	MacGregor, Robert, Paton Street, Inverness.

MISCELLANEOUS.

CLASS 9. HAND-MADE FLOOR RUG (WOOL).—PREMIUMS, £3, £2, and £1.

1st	No. 179	MacGregor, Mrs F. C., 36 Argyll Street, Lochgilphead.
2nd	No. 181	Macleod, Miss Peggy, 5 Garenin, Carloway, Isle of Lewis.
3rd	No. 169	Cross, Thomas, Princess Louise Scottish Hospital, Bishopton.
V	No. 164	Buttar, Mrs A. M., Schoolhouse, Drumgeith, Dundee.
H	No. 175	Henderson, Miss N., 16 Eskview Villas, Eskbank, Midlothian.
C	No. 180	MacKean, Mrs, 70 Comiston Road, Edinburgh.
C	No. 183	Roger, Miss Blanche K., Balgove, St Andrews.
C	No. 182	MacPhail, Mrs, Drinan, Ardentinny, Dunoon.

CLASS 10. SPECIMEN OF EMBROIDERY—White (to be exhibited unwashed).—PREMIUMS, £3, £2, and £1.

1st	No. 196	Telfer, Miss I., Ottercaps, Kirkwhelpington, Newcastle-on-Tyne (Nightdress Case).
2nd	No. 194	Rae, Miss Margaret A., The Laurels, Errol (Italian Embroidery).
3rd	No. 189	Adamson, Miss Christina, Hill of Mid-Clyth, Mid-Clyth, Caithness (Table Centre).
V	No. 192	Grieve, Mrs R., Charlecote, Fort William (Nightdress).

CLASS 11. SPECIMEN OF COLOURED EMBROIDERY—Silk or Cotton.—PREMIUMS, £3, £2, and £1.

1st	No. 215	Keay, Mrs, Champions, Beaminster, Dorset (Bedcover).
2nd	No. 225	Stratton, Miss E., 249 Arbroath Road, Dundee (Supper Cloth).
3rd	No. 208	Duncan, Miss Frances, Parkhill, Arbroath (Toilet Cover).
V	No. 213	Hamilton, Miss Janet, Brucehaven, Dunfermline (Tea Cloth).
H	No. 206	Donald, Miss M. C. B., Murieston, Mid-Calder (Panel for Pole Fire Screen).
C	No. 207	Downing, Mrs H. H., Knotwood Farm, Stony Stratford (Handkerchief Sachet).
C	No. 212	Gray, Miss Hilda B. S., 18 Market Terrace, Strichen (Cushion Cover).

CLASS 12. SPECIMEN OF COLOURED EMBROIDERY—Woolwork.—PREMIUMS, £3, £2, and £1.

1st	No. 254	Stratton, Miss E., 249 Arbroath Road, Dundee (Cushion).
2nd	No. 234	Downey, Miss Mary J., The Whins, Kilrenny, Anstruther (Fire Screen).
3rd	No. 249	Scott, Mrs William, Balfunning, Balfron, Stirlingshire (Chair-seat Cover).
V	No. 246	Morrison-Miller, Mrs Belle, Moatmill, Dundee (Table Scarf).
H	No. 248	Rough, Miss Jeanie, Sherwood, Kirriemuir (Table Runner).
C	No. 228	Anderson, Miss L. M., Lochside, Auldbar Road Station, Forfar (Table Runner).
C	No. 237	Gray, Miss Hilda B. S., 18 Market Terrace, Strichen (Fire Screen).
C	No. 242	Kinloch, Miss I. B., Brantwood, West Linton, Peeblesshire (Tea Cosy).

CLASS 13. SPECIMEN OF OLD ENGLISH QUILTING.—PREMIUMS, £3, £2, and £1.

1st	No. 256	Alexander, Miss E., Balmule, Dunfermline (Quilt).
2nd	No. 261	Grieve, Mrs R., Charlecote, Fort William (Cushion).
3rd	No. 258	Duncan, Mrs D., Parkhill, Arbroath (Nightdress Sachet).
V	No. 257	Cheape, Mrs M. B., Tiroran House, Isle of Mull (Child's Cot Cover).
H	No. 262	Jenkins, Miss M. H. S., The Craggs, Blackwaterfoot, Isle of Arran (Nightdress Sachet).
C	No. 260	Gough, Miss D. M., Aros, Tobermory, Isle of Mull (Child's Cot Cover).

CLASS 14. LEATHER GLOVES.—PREMIUMS, £2, £1, and 10s.

1st	No. 270	Dunchurch and Thurlaston Women's Institute, Rugby.
2nd	No. 266	Downing, Mrs H. H., Knotwood Farm, Stony Stratford.
3rd	No. 275	Newton, Miss Mary, Ruskin Mount, Millom, Cumberland.
H	No. 269	Dunchurch and Thurlaston Women's Institute, Rugby.
C	No. 272	Dunchurch and Thurlaston Women's Institute, Rugby.

CLASS 15. SPECIMEN OF LEATHER WORK OTHER THAN GLOVES.—PREMIUMS, £2, £1, and 10s.

1st	No. 277	Bakewell, Mrs E. L., Rose Villa, The Saltisford, Warwick (Handbag).
2nd	No. 280	Downing, Mrs H. H., Knotwood Farm, Stony Stratford (Writing Case).
3rd	No. 276	Bakewell, Mrs E. L., Rose Villa, The Saltisford, Warwick (Blotter).
H	No. 288	Wallace, Miss Agnes A., Balgreddan, Kirkcudbright (Writing Case).

CLASS 16. SPECIMEN OF FURCRAFT.—PREMIUMS, £2, £1, and 10s.

1st	No. 291	Downing, Mrs H. H., Knotwood Farm, Stony Stratford, (Gloves).
2nd	No. 297	Newton, Miss Mary, Ruskin Mount, Millom, Cumberland (Gloves).
3rd	No. 295	Julian, Miss Agnes S., Woodlands, Muirdrum, Carnoustie (Moccasins).
V	No. 296	Newton, Miss Annie, Ruskin Mount, Millom, Cumberland (Gloves).
H	No. 293	Dunchurch and Thurlaston Women's Institute, Rugby (Gloves).
C	No. 289	Allison, Miss M. Douglas, 1 Rankeillor Street, Elie (Fox Stole).

CLASS 17. SPECIMEN OF HAND-PAINTED POTTERY.—PREMIUMS, £2, £1, and 10s.

1st	No. 298	Blair, Mrs Catherine, See Worthy Cottage, North Berwick (Jug).
2nd	No. 312	Young, Mrs A., Edinburgh Road, Tranent (Jar).
H	No. 311	Wight, Miss Betty, Glen House Studio, North Berwick (Quaich).
C	No. 305	Henderson, Miss T., St Rule, Mauchline (Biscuit Box).

CLASS 18. SPECIMEN OF BASKET-WORK (Raffia not eligible).—PREMIUMS, £2, £1, and 10s.

1st	No. 321	Smith, Mrs Mitchell, Bradyston, Murthly (Linen Basket).
2nd	No. 319	Roger, Miss Blanche K., Balgove, St Andrews (Linen Basket).
3rd	No. 317	Nicoll, Miss A., 15 Clepington Road, Dundee (Wastepaper Basket).
V	No. 320	Smith, Mrs Mitchell, Bradyston, Murthly (Chair).
C	No. 314	Kellock, Mrs, Rathillet Mill, Cupar, Fife (Willow Basket).
C	No. 322	Squires, Mrs E. N., 12 The Butts, Warwick (Shopping Basket).

CLASS 19. HOME-SPUN YARN—2-3 cuts.—PREMIUMS, £2, £1, and 10s.

1st	No. 337	Smith, Miss Dollina, Gunnister, Uyeasound, Shetland.
2nd	No. 338	Smith, Miss Mary J., Phail, Westing, Uyeasound, Shetland.
3rd	No. 327	Cluness, Mrs A. T., Muness, Uyeasound, Shetland.
V	No. 335	Nicolson, Mrs A. F., Mark Aith, Bixter, Shetland.
H	No. 332	Jamieson, Mrs Robert G., Moarfield, Cullivoe, Shetland.
C	No. 330	Hunter, Mrs J. G., Billister, North Nesting, Shetland.

CLASS 20. SPECIMEN OF HAND-MADE LACE.—PREMIUMS, £3, £2, and £1.

1st	No. 344	Leach, Mrs, 18 Gayton Road, Harrow.
2nd	No. 340	Burns, Miss Isabella, 1 Gorgie Road, Edinburgh.
3rd	No. 341	Darge, Mrs G. J., 68 Merchiston Avenue, Edinburgh.
V	No. 351	Wedderburn-Ogilvy, Miss I., Inverisla, Alyth.
H	No. 339	Batchelor, Mrs L. M., Claypotts, Broughty Ferry.

CONFINED CLASSES.

Open to Women's Rural Institutes and Members thereof in the whole of Scotland.

CLASS 21. MEN'S GOLF or KILT HOSE.—PREMIUMS, £2, £1, and 10s.

1st	No. 359	Duff, Mrs, Tayness, Kilmartin, Argyll.
2nd	No. 376	Ross, Miss Lizzie, Myrtle Bank, Hillside, Montrose.
3rd	No. 373	Robb, Mrs James, Old Schoolhouse, Drumsturdie, Kingennie, Angus.
V	No. 361	Garrick, Miss Eliza H., Helendale, Lerwick.
H	No. 354	Cairns, Miss Helen, House of Farr, Inverness.
C	No. 362	Gibson, Mrs Frederick, Balfunning, Balfron, Stirling.
C	No. 377	Russell, Mrs Robert, 5 Milton Road, Windygates, Fife.

CLASS 22. FLOOR RUG in Jute.—PREMIUMS, £3, £2, and £1.

1st	No. 388	MacGregor, Mrs C. M., Edinchip Lodge, Lochearnhead.
2nd	No. 381	Broomfield, Mrs A., 3 South Feus, Upper Largo, Fife.
3rd	No. 387	Galloway, Miss Jeanie, 2 High Street, Pittenweem.
V	No. 383	Cunninghame, Mrs Erskine, Balgownie, Culross.
H	No. 394	Wilson, Mrs James, 1 North Row, Charlestown, Dunfermline.

CLASS 23. SOFT TOY.—Premiums, £2, £1, and 10s.

1st	No. 402	Erskine, Miss G. M., Claymires Cottage, Newstead, Melrose (Monkey).
2nd	No. 396	Bald, Miss Dorothy, 14 Duntrune Terrace, Broughty Ferry (Dog).
3rd	No. 410	Murray, Miss Anne M., Borough Gates, Aberlady (Monkey).
V	No. 412	Parsons, Mrs, Achnaba, Lochgilphead (Hen).
C	No. 395	Anderson, Miss M. C., Sea View, Abbey Burnfoot, Castle Douglas (Aberdeen Terrier).
C	No. 399	Couston, Mrs Marion, Westruther Mains, Gordon, Berwickshire (Aberdeen Terrier).

CLASS 24. SPECIMEN OF ITALIAN QUILTING.—Premiums, £3, £2, and £1.

1st	No. 433	Rattray, Miss Janet A., Muirdrum, Carnoustie (Dressing Gown).
2nd	No. 416	Brown, Miss Chrissie, Dipple, Fochabers (Bedspread).
3rd	No. 427	Grant, Miss B., Wester Logie, Blairgowrie (Nightdress Sachet).
V	No. 425	Douglas, Mrs Palmer, Midgard House, Cavers (Cushion).
H	No. 434	Smith, Mrs I., The Lodge, Newtonairds, Dumfries (Nightdress Case).
C	No. 428	Jenkins, Miss M. H. S., The Craggs, Blackwaterfoot, Isle of Arran (Nightdress Sachet).
C	No. 429	M'Leod, Miss Margaret A., Leven House, Milnathort (Cushion).

CLASS 25. UPHOLSTERED BOX.—Premiums, £2, £1, and 10s.

1st	No. 441	Roddan, Mrs J., 11 King Street, Maxwelltown, Dumfries.
2nd	No. 440	Nicoll, Miss A., 15 Clepington Road, Dundee.
3rd	No. 442	Samson, Mrs E. F., Downfield, Ladybank, Fife.
C	No. 439	Muir, Mrs Christina, Millbank Place, Uphall.

HORTICULTURAL SECTION

GOLD MEDALS for best exhibit in each of the following Sections.

A. FLORAL.

No. 16 Dobbie & Co., Limited, Seedsmen and Nurserymen, Edinburgh.

B. FORMAL or ROCK GARDENS.

No. 21 Laurie, James, & Son, Blackness Nursery, Dundee.

C. FLOWERING PLANTS.

No. 13 Storrie & Storrie, Limited, The Nurseries, Glencarse, Perthshire.

D. ROCK PLANTS and ALPINES.

No. 5 Laird & Dickson, Pinkhill Nurseries, Edinburgh.

E. VEGETABLES.

(No entry.)

SILVER MEDALS for other exhibits of outstanding merit.

No. 3 Laird, W. P., & Sinclair, Limited, 9-13 Nethergate, Dundee, and Laird & Smith, Cupar, Fife.
No. 7 Aitken, Peter, Ballincrieff Nursery, Bathgate.
No. 9 Storrie Thyne & Co., Limited, Downfield Nurseries, Dundee.
No. 11 Dicksons & Co., 20 Charlotte Square, Edinburgh.
No. 14 Allwood Brothers, Wivelsfield Nurseries, Haywards Heath, Sussex.
No. 18 Croll, D. & W., Limited, Nurserymen, Dundee.

The following were COMMENDED :—

No. 1 Maxwell & Beale, Limited, Broadstone, Dorset.
No. 4 Edrom Nurseries, Edrom, Berwickshire.
No. 10 Austin & M'Aslan, Limited, 91-95 Mitchell Street, Glasgow.
No. 15 Forbes, John (Hawick), Limited, Buccleuch Nurseries, Hawick.
No. 19 Keeling, A. J., & Sons, Grange Nurseries, Westgate Hill, Bradford.
No. 19a Fairley, James, & Co., Cairneyhill, Fife.

HORSE-SHOEING COMPETITION

Open to Shoeing-Smiths from any part of Great Britain, Northern Ireland, and Irish Free State.

THURSDAY, 22nd JUNE.

Gold Medal, given by the National Master Farriers' and Blacksmiths' Association, *to be awarded to the competitor obtaining the highest number of points in Class* 1.

Gold Watch, given by Messrs William Martin, Sons, & Co., Coatbridge, *to the winner of First Prize in Class* 1.

Canteen of Cutlery, given by Messrs Neilson & Cleland, Ltd., Coatbridge, *to the winner of Second Prize in Class* 1.

Gold Medal, given by the Mustad Horse Nail Company, *to the winner of Third Prize in Class* 1.

Gold Medal, given by Capewell Horse Nail Company, *to the winner of Fourth Prize in Class* 1.

CLASS 1. FARM HORSES (Open Class). 1st Prize, £5 and Gold Watch; 2nd Prize, £5 and Canteen of Cutlery; 3rd Prize, £5 and Gold Medal; 4th Prize, £4 and Gold Medal; 5th Prize, £3; 6th Prize, £2; 7th Prize, £2; 8th Prize, £1; 9th Prize, £1.

1st	No. 43	M'Donald, Ian, Castlehill Smithy, Kintore.
2nd	No. 25	Stephen, Ralph A., 76 New Wynd, Montrose.
3rd	No. 42	Davidson, Alexander, 15 West Cathcart Street, Buckie.
4th	No. 33	Nicol, William, Millbank, Cluny, Tillyfourie.
5th	No. 57	Young, Matthew L., Pollok Town, Newton Mearns.
6th	No. 20	M'Donald, Robert, Hatton of Fintray, Aberdeen.
7th	No. 27	Strachan, Ernest, Invereighty Smithy, Forfar.
8th	No. 7	Duncan, James, Newburgh, Aberdeen.
9th	No. 5	Jarvie, David, Jun., Mollinsburn, Croy Station.

FRIDAY, 23rd JUNE.

Silver Tea Service, given by the Scottish Iron and Steel Co., Ltd., Glasgow, *to the winner of First Prize in Class* 2.

Canteen of Cutlery, given by Messrs Neilson & Cleland, Ltd., Coatbridge, *to the winner of Second Prize in Class* 2.

Gold Medal, given by the Mustad Horse Nail Company, *to the winner of Third Prize in Class* 2.

CLASS 2. FARM HORSES (for Competitors under twenty-five years of age).—1st Prize, £5 and Silver Tea Service; 2nd Prize, £3 and Canteen of Cutlery; 3rd Prize, £2 and Gold Medal; 4th Prize, £1.

1st	No. 62	Borthwick, James, Mossend Smithy, Gorebridge.
2nd	No. 64	Redford, Alexander, Jun., Cargill Smithy, Meikleour.
3rd	No. 74	Nicol, F. J., Millbank, Cluny, Tillyfourie.
4th	No. 76	Mackenzie, Thomas, Raddery Smithy, Fortrose.

SHOE-MAKING COMPETITION

WEDNESDAY, 21st JUNE.

1st Prize, £5; 2nd Prize, £4; 3rd Prize, £3;
4th Prize, £2; 5th Prize, £1.

1st	No. 45	Crichton, George G., 40 Livery Street, Bathgate.
2nd	No. 43	Blackie, John, Ryslaw Smithy, Duns.
3rd	No. 33	M'Donald, Ian, Castlehill Smithy, Kintore.
4th	No. 13	Stephen, Ralph A., 76 New Wynd, Montrose.
5th	No. 8	M'Donald, Robert, Hatton of Fintray, Aberdeen.

LIVE STOCK JUDGING COMPETITION

Open to all persons not exceeding 23 years of age at the date of the Competition.

'Glasgow Herald' Challenge Cup, value £50, *to be awarded each year to the team winning the First Prize in the Team Competition.* Given by Messrs George Outram & Co., Ltd., Glasgow.

Bell Baxter Continuation Classes (Team A)	equal, 254 points.
West Perthshire Young Farmers' Club (Team A)	

Gold Medal, *to be awarded to the highest individual scorer.* Given by Messrs George Outram & Co., Ltd., Glasgow.

No. 31 Howie, John, Balhelvie, Newburgh, Fife . . . 64 points

INDIVIDUAL COMPETITION.

Prizes, £5, £4, £3, £2, £1, £1.

1st		No. 31	Howie, John, Balhelvie, Newburgh, Fife . .	64 points
2nd		No. 51	Strang, James S., Moneydie, Luncarty, Perth .	62 ,,
3rd	equal	No. 3	Clark, Robert, Loanhead, Biggar . .	60 ,,
4th		No. 67	Biggar, James, Grange, Dalbeattie .	60 ,,
5th		No. 70	MacIntosh, Archie, Strageath Hall, Muthill	60 ,,
6th		No. 85	Paterson, James S., Hayhill Farm, Gartcosh .	58 ,,

TEAM COMPETITION.

1st, £10 and 5 Medium Silver Medals.
2nd, £5 and 5 Medium Silver Medals.

1st	equal	Bell Baxter Continuation Classes (Team A) .	254 points
2nd		West Perthshire Young Farmers' Club (Team A)	254 ,,

Special Prize for College team placed highest in Competition, £5.

Edinburgh and East of Scotland College of Agriculture, 232 points.

BUTTERMAKING COMPETITIONS

CHAMPIONSHIP CLASS.

Gold Medal.

No. 79 Lee, Miss Cicely M., Bath Arms Hotel, Minsterley, Shropshire.

Silver Medal.

No. 39 Prentice, Miss Janet W., Craigrie, Clackmannan.

OPEN CLASS—FIRST SECTION.

PREMIUMS, £5, £3, £2, and £1.

1st	No. 38	Park, Miss Jean, Ballingrew, Thornhill, Perthshire.
2nd	No. 39	Prentice, Miss Janet W., Craigrie, Clackmannan.
3rd	No. 34	Drake, Miss Margaret M., Middlerigg, Bathgate.
4th	No. 37	Murdoch, Miss Mary, Over Benchil, Stanley, Perthshire.
V	No. 31	Adam, Miss Mary M., Burmieston, Methven.
H	No. 33	Brown, Miss Margaret W., Cloag Farm, Methven.
C	No. 41	Sutherland, Miss Netty, Woodmouth, Madderty, Crieff.

OPEN CLASS—SECOND SECTION.

PREMIUMS, £5, £3, £2, and £1.

1st	No. 43	Arkley, Miss Mary C., Kingsfield, Linlithgow.
2nd	No. 46	Murray, Miss Maria A., Faugh Beeches, Heads Nook, Carlisle.
3rd	No. 50	Wilkieson, Miss Agnes A., Isle of Gigha, Argyll.
4th	No. 47	Paul, Miss Jeanie D., Stacks, Bo'ness.
V	No. 51	Wright, Miss Katharine, Greenbank, Temple Sowerby, Penrith.
H	No. 48	Potter, Miss Agnes A., Crossgreen Farm, Uphall.
C	No. 49	Reid, Miss Rachael C. M., Blair, Udny, Aberdeenshire.

OPEN CLASS—THIRD SECTION.

PREMIUMS, £5, £3, £2, and £1.

1st	No. 58	Macfarlane, Miss Jane R., Cambuslea, Balloch, Dumbartonshire.
2nd	No. 63	Wrathall, Miss Jennie G., High Barn, Milnthrope, Westmorland.
3rd	No. 61	Potter, Miss Margaret P., Crossgreen Farm, Uphall.
4th	No. 54	Cook, Miss Anne, Claynod, Kilmorrie, Arran.
V	No. 53	Carson, William D., Seafield, Port William, Wigtownshire.
H	No. 59	Macnair, Miss Ishbel G., Omard, Kirn, Argyll.
C	No. 57	Gordon, Robert, Cherrybank Cottage, Dreghorn, Ayrshire.

OPEN CLASS—FOURTH SECTION.

PREMIUMS, £5, £3, £2, and £1.

1st	No. 69	Park, Tom, Comely Bank, Strathaven.
2nd	No. 64	Brodie, Miss Barbara F., Kintour, 10 Kingsburgh Drive, Paisley.
3rd	No. 65	Lewis, John E., 5 Dalmilling Place, Whitletts, Ayr.
4th	No. 68	Mitchell, Miss Janet, Castleton, Fordoun, Kincardineshire.
V	No. 66	Mackay, Miss Ranee, 3 Tay Terrace, Broughty Ferry.
H	No. 74	Turner, Frank N., 6 Cassillis Street, Ayr.
C	No. 70	Parlane, James, Roselea, Middleton Street, Alexandria.

OPEN CLASS—FIFTH SECTION.

PREMIUMS, £5, £3, £2, and £1.

1st	No. 85	Stratton, Miss Mabel K., Charlton, Pershore, Worcester.
2nd	No. 79	Lee, Miss Cicely M., Bath Arms Hotel, Minsterley, Shropshire
3rd	No. 86	Stratton, Miss Mary A., Meadowmore, Methven, Perthshire.
4th	No. 78	Edwards, Miss Winifred J. A., Kingask, St Andrews.
V	No. 75	Boyd, Miss Helen S. M., Dunnydeer, Insch, Aberdeenshire.
H	No. 83	Peer, Miss P., Rectory Farm, Tibberton, Droitwich.
C	No. 77	Corkill, Miss Florence E., Ballamenagh Farm, Baldrine, Isle of Man.

NOVICE CLASS—FIRST SECTION.

PREMIUMS, £3, £2, and £1.

1st	No. 8	Reid, Miss Anne, Balmossie, Broughty Ferry.
2nd	No. 3	Henderson, Miss Emma C., West Newbigging, Arbroath.
3rd	No. 6	M'Ara, Miss Margaret, Mains of Callander, Crieff.
V	No. 10	Wylie, Miss Alice W. G., Stockbridge, Dunblane.
H	No. 9	Taylor, Miss Peggy S., East Glasterlaw, Friockheim, Angus.
C	No. 7	Mackenzie, Miss Betsy B., Home Farm, Errol Park, Errol, Perthshire.

NOVICE CLASS—SECOND SECTION.

PREMIUMS, £3, £2, and £1.

1st	No. 11	Arkley, Miss Mary C., Kingsfield, Linlithgow.
2nd	No. 19	Paul, Miss Jeanie D., Stacks, Bo'ness.
3rd	No. 20	Scott, Miss Shiona, Enzieholm, Langholm.
V	No. 15	Jamieson, Miss Margaret, Burnside, Netherby, Stonehaven.
H	No. 16	Liddle, Miss Jean, Knock House, Crossford, Dunfermline.
C	No. 13	Edmunds, Miss Nan E., Montrave Dairy, Leven, Fife.

NOVICE CLASS—THIRD SECTION.

PREMIUMS, £3, £2, and £1.

1st	No. 30	Wilkieson, Miss Agnes A., Isle of Gigha, Argyll.
2nd	No. 21	Brodie, Miss Barbara F., Kintour, 10 Kingsburgh Drive, Paisley.
3rd	No. 23	Edwards, Miss Winifred J. A., Kingask, St Andrews.
V	No. 25	Gordon, Robert, Cherrybank Cottage, Dreghorn, Ayrshire.
H	No. 24	Funkie, Miss Annie M., Ivy Cottage, East Wemyss, Fife.

NOVICE CLASS—FOURTH SECTION.

PREMIUMS, £3, £2, and £1.

1st	No. 96	Turner, Frank N., 6 Cassillis Street, Ayr.
2nd	No. 89	Carson, William D., Seafield, Port William, Wigtownshire.
3rd equal	No. 87	Anderson, Miss Jean, 64 Murray Place, Stirling.
	No. 94	Thacker, John, 229 High Street, Ayr.
V	No. 90	Cook, Miss Anne, Claynod, Kilmorrie, Arran.
H	No. 91	Donald, Miss Morag, The Whins, Viewfield Road, Bishopbriggs, Glasgow.
C	No. 88	Cameron, Miss Jessie C., 27 Lamington Road, Cardonald, Glasgow.

NOVICE CLASS—FIFTH SECTION.

PREMIUMS, £3, £2, and £1.

1st	No. 107	Steele, Miss Dorothy, Ravelston Lea, Blackhall, Edinburgh.
2nd	No. 101	Lewis, John E., 5 Dalmilling Place, Whitletts, Ayr.
3rd	No. 105	Neill, James, Pilton, Laurieston, Falkirk.
V	No. 106	Scott, Thomas, Auchnotroch, Auchenheath, Lanarkshire.
H	No. 27	Parlane, James, Roselea, Middleton Street, Alexandria.

NEW IMPLEMENTS

The Judges, having inspected the new implements submitted for competition, awarded Silver Medals to the following :—

Bamfords, Ltd., Uttoxeter, Staffordshire—Bamford Diesel Engine, 6-B.H.P. (No. 418).

Dunlop Rubber Co., Ltd., Fort Dunlop, Birmingham—Dunlop Pneumatic Land Wheel Equipment (No. 1620).

JUDGES.

Shorthorn—John Barnes, Aikbank, Wigton, Cumberland; Charles Crombie, Cluny Home Farm, Sauchen.

Aberdeen-Angus—John S. Grant, Skillymarno, Strichen; C. F. Tulloch, Braevail, Lethen, Nairn.

Galloway—John Drynan, Knockiebay, New Luce.

Belted Galloway—J. W. Alexander, Golfhill, Moffat.

Highland Cattle—John Brown, Kilmore Farm, Oban.

Ayrshire—A. Y. Allan, Aitkenbar, Dumbarton; Robert Dunlop, Chapelhill, Castle Douglas.

British Friesian—F. W. Gilbert, The Manor, Chellaston, Derby; William Marriage, Bradbourne Farm, Sevenoaks.

Fat Cattle—C. F. Tulloch, Braevail, Lethen, Nairn.

Clydesdale Stallions, Colts, and Geldings—George Argo, Petty, Fyvie; James Gray, West Newhall, Kingsbarns.

Clydesdale Mares and Fillies—James Fleming, Easter Coull, Auchterarder; George M'Dowall, Briarbrae, Stranraer.

Suffolk Geldings—Captain C. E. FitzRoy, The Estate Office, Langham, Oakham.

Hunters—Captain Guy Lucas, Brackley, Northants.

Highland and Western Island Ponies—George Mundell, Kingaldores, Broughton, Peeblesshire.

Shetland Ponies—Charles Aitkenhead, Carr House Farm, New Seaham.

Saddle Classes—Captain Guy Lucas, Brackley, Northants.

Harness Classes—Alexander Morton, Gowanbank, Darvel.

Draught Geldings in Harness—James Fleming, Easter Coul, Auchterarder.

Blackface—James D. Bennie, Dunruchan, Muthill; Walter C. Burton, Auchtertyre, Tyndrum.

Cheviot—Thomas Elliot, Kirndean, Newcastleton; Thomas Scott, Milsington, Hawick.

Border Leicester—Robert W. Bell, Fruithill, Hillsborough, Co. Down; William Faulder, Oak Bank, Longtown, Cumberland.

Half-Bred—William I. Elliot, Middleton, Stow.

Oxford Down—Robert Hobbs, Kelmscott, Lechlade, Glos.

Suffolk—G. A. Goodchild, Great Yeldham Hall, Great Yeldham, Essex.

Dorset Horn—W. C. Smart, Sunny Cottage, Pydeltrenthide, Dorchester, Dorset.

Fat Sheep—William I. Elliot, Middleton, Stow.

Goats—N. Cradock, Sandhutton, Thirsk, Yorks.

Large White—W. W. Ryman, The Manor Farm, Wall, Lichfield, Staffs.

Large Black—G. A. Goodchild, Great Yeldham Hall, Great Yeldham, Essex.

Poultry—David Reid, Firth View, Portgordon—Classes 1 to 14, 28 to 50, 78 to 89; James Garrow, Edinalee, Loanhead—Classes 15 to 21, 70 to 73, 90 to 106, 123 to 127; J. H. Gilbert, Binfield, Bracknell, Berks—Classes 22 to 27, 51 to 69, 74 to 77, 107 to 122.

Eggs—Alexander F. Smith, Ardmohr, East Calder.

Fur-Producing Rabbits—James Garrow, Edinalee, Loanhead.

Honey, &c.—Joseph Tinsley, Morven, Seafield Road, Ayr.

Dairy Produce—Robert H. Lawson, of William Lawson & Sons, 21 College Lane, Glasgow, C. 1.

Buttermaking, Open and Novice Sections—William M'Fadzean, 35 Dundonald Road, Kilmarnock; William Smith, Naldera, Colinton, Midlothian; A. A. M. Fisher, St Cuthbert's Co-operative Association, Ltd., 92 Fountainbridge, Edinburgh.

Buttermaking Championship—William Smith, Naldera, Colinton, Midlothian.

Rural Industries—Miss Bruce, 111A George Street, Edinburgh—Classes 1, 2, 3, 4, 5, 6, 7, 8, 9, 19, 21, 22; Miss A. D. Angus, Gray's School of Art, Aberdeen — Classes 10, 11, 12, 13, 20, 24; Miss M. B. Fulton, Occupational Therapy Department, Royal Mental Hospital, Aberdeen—Classes 14, 15, 17, 18, 23, 25; Mrs E. Balfour Graham, Levenbank, Leven—Class 16.

Horse-Shoeing and Shoe-Making—John Brown, M.R.C.V.S., 55 York Place, Perth; James Hall, Halfway House, Paisley Road, Cardonald; John Ritchie, 19 Jopps Lane, Aberdeen.

Horticulture—N. F. Barnes, Eaton Gardens, Chester; L. B. Stewart, Royal Botanic Garden, Edinburgh.

STEWARDS.

Cattle.—James Durno, Crichie, Inverurie.

Horses.—George Grant, Glenfarclas, Blacksboat.

Sheep, Goats and Pigs.—Robert Macmillan of Holm of Dalquhairn, Woodlea, Moniaive.

Poultry and Rabbits.—James R. Lumsden of Arden, Dumbartonshire.

Forage.—John W. Prentice, Craigrie Farm, Clackmannan.

Implements.—J. P. Ross - Taylor, Mungoswalls, Duns.

Horticulture.—A. A. Hagart Speirs of Elderslie, Houston House, Houston.

Grand Stands.—Major Robert W. Sharpe of The Park, Earlston.

Gates.—Ian M. Campbell, Balblair, Invershin.

Catering, Bees, Honey, &c.—John E. B. Cowper, Gogar Mains, Corstorphine.

ASSISTANT STEWARDS.

Cattle.—Alexander Munro of Leanach, Culloden Moor, Inverness.

Horses.—John P. Sleigh of St John's Wells, Fyvie.

Sheep, Goats and Pigs.—James M'Laren, Cornton, Bridge of Allan.

Forage.—T. Mercer Sharp, Bardrill, Blackford.

Implements.—Phipps O. Turnbull, Bowmont, Dunbar.

Grand Stands.—Hon. Walter T. H. Scott, Master of Polwarth, Harden, Hawick.

Gates.—James P. Brown, Dipple, Fochabers.

ATTENDING MEMBERS.

Shorthorn.—*J. P. Ross-Taylor, Falconer L. Wallace,* John E. Murray, James Paton, William Wylie.

Aberdeen-Angus.—*James M'Laren, Thomas Elder,* Hugh S. Black, James Grant, Alexander Storrar.

Galloway.—*John Hewetson,* Patrick Arnot, Robert Inglis.

Belted Galloway.—*George Buchanan, William Henderson,* David Blair.

Highland Cattle. — *Captain Thomas Elliot, Alexander Munro,* P. K. M. Smith.

Ayrshire. — *Thomas Templeton, William P. Gilmour,* David Bryce, Alexander Graham, James Piper.

British Friesian.—*Robert Park, F. W. Christie,* William B. Black, John Hamilton, William Stirton.

Fat Cattle.—*William Tod,* Robert Meiklem, Jun.

Clydesdale Stallions and Colts.—*Lord Rowallan, Alexander Batchelor,* William Baxter, W. W. Bell, M. B. Wallace.

Clydesdale Geldings.—*William C. Hunter, Treasurer William Frain,* Francis W. Roger, W. Patrick Whyte.

Clydesdale Mares and Fillies.—*Robert Miller, T. G. Wilson,* Donald M'Dougall, Robert M'Gregor, Convener John Phin.

Suffolk Geldings. — *William Meiklem,* William Clark, George Tasker.

Hunters.—*Colonel F. J. Carruthers, Major Robert W. Sharpe,* W. M. Johnston, James Simpson.

Highland and Western Island Ponies.—*J. E. Kerr, Gavin Ralston,* T. P. D. Murray, James Whyte.

Shetland Ponies. — *James Kilpatrick, J. Belfrage Black,* Lord Dean of Guild W. H. Brown, David Pattullo.

Saddle Classes.—*Colonel F. J. Carruthers, Major Robert W. Sharpe,* W. M. Johnston, James Simpson.

Harness Classes.—*Thomas Clark,* William A. Allan, William Gardiner.

Draught Geldings in Harness.—*William C. Hunter, Treasurer William Frain,* Francis W. Roger, W. Patrick Whyte.

Blackface.—*The Hon. Walter T. H. Scott, Master of Polwarth, James Wylie,* Alfred S. Molison, Hugh L. Stewart.

Cheviot.—*Phipps O. Turnbull,* Joseph Harper, Robert M. Reid.

Border Leicester.—*Major S. Strang Steel,* H. B. Ireland, W. A. Martin Smith.

Half-Bred. — *Captain John C. Stewart,* John Motion.

Oxford Down.—*T. Mercer Sharp,* James Butters.

Suffolk.—*Alexander Clark,* Alexander Macrae.

Dorset Horn.—*John M. Roger,* Major W. B. Robertson.

Fat Sheep. — *Captain John C. Stewart,* John Motion.

Goats.—*Andrew Pollock,* Thomas Young.

Large White.—*John M. Roger,* James Dargie, Convener Gillies.

Large Black.—William Lindsay, Adam Waldie.

Poultry.—*Dr J. F. Tocher,* D. B. M'Lay, John M'Lean, John Pattullo.

Eggs.—*Dr Stewart MacDougall,* William Aiken, Bailie Loggie.

Fur-Producing Rabbits.—William Mungall, William Young.

Honey, &c.—A. Aikman Blair, W. H. Blyth Martin, John A. Turnbull.

Dairy Produce. — *Dr Stewart MacDougall,* William Aiken, Bailie Loggie.

Buttermaking.—*Alexander Forbes,* Harry H. Eadie, Miss J. Macdonald.

Rural Industries.—James Bruce, James D. Hay, Michael G. M'Diarmid.

Horse-Shoeing and Shoe-Making.—*John E. B. Cowper, George Buchanan, John M. Roger,* Alexander Anderson, Alexander M'Laggan, Robert Reid.

Horticulture.—Frederick D. S. Sandeman, Maurice G. Kidd.

VETERINARY DEPARTMENT.

Class Examinations, 1933.

Silver Medals were awarded to the following :—

GLASGOW VETERINARY COLLEGE.

Chemistry	Duncan S. Campbell, Greenock.
Biology	John Wharrier, Dumbarton.
Senior Anatomy	Fergus John Hill, Ecclefechan.
Physiology	John J. Murdoch, Glasgow.
Zootechny	Robert M'Grath, Old Kirkpatrick.
Materia Medica	James G. Murray, Glasgow.
Pathology	George Briggs, London.
Hygiene	George Briggs, London.
Surgery	David Harkness, Lanark.
Medicine	Helen J. Mitchell, Glasgow.
Animal Husbandry—Part 1	John Macdonald, Portree.

11 Large Silver Medals, £10, 3s. 6d.

ROYAL (DICK) VETERINARY COLLEGE.

Chemistry	J. Norval, Clackmannan.
Biology	T. W. Whittick, Edinburgh.
Senior Anatomy	H. E. Harbour, London.
Physiology	H. E. Harbour, London.
Zootechny	S. T. Harris, Weymouth.
Materia Medica	A. Robertson, Stonehaven.
Pathology	J. M. Rorrison, Thornhill.
Hygiene	A. Robertson, Stonehaven.
Surgery	W. E. Lancaster, Bletchley.
Medicine	J. M. Fraser, Auldearn.

10 Large Silver Medals, £9, 5s.

DISTRICT COMPETITIONS, 1933.

26 Districts—	21 Grants of £12 each; 2 of £11, 10s.; 1 of £11, 5s.; 1 of £11; and 1 of £7, 6s. 3d.	£304	11	3
14 ,,	Grants of £15 each	210	0	0
	Special Grants: Medals, £13, 1s.	235	11	0
	Medals for Shows (75 large)	69	7	6
	Premiums and Medals for Cottages, Gardens, &c.	13	14	0
37 ,,	Medals for Hoeing Competitions, 1932-33	14	6	9
169 ,,	Medals for Ploughing, 1932-33	84	10	0
Long Service Certificates, £36, 8s. 7d.; Gold Medals, £58, 13s. 3d.; and Silver Medals, £40, 19s. (1932-33)		136	0	10
		£1068	1	4

ABSTRACT OF PREMIUMS.

District Competitions	£932	0	6
Long Service Awards	136	0	10
Veterinary Colleges (21 Medals)	19	8	6
	£1087	9	10

INVERNESS SHOW, 1932.

ALTERATIONS IN PRIZE LIST.

On account of animals failing to comply with the Regulations as to calving, the following changes have taken place in the list of animals for which prizes were awarded:—

CATTLE.

BELTED GALLOWAY.

Class 29. HEIFER, born on or after 1st December 1929.—Premiums, £10, £5, £3, and £2.

1st	No. 190	Cayzer, Sir August, Bart., Gartmore House, Gartmore, Stirling, "Gartmore Norah I." (2066 B).
2nd	No. 189	Cayzer, Sir August, Bart., Gartmore House, Gartmore, Stirling, "Gartmore Doreen II." (2056 B).
*	No. 193	Hamilton, General Sir Ian, 1 Hyde Park Gardens, London, "Lullenden Estelle II." (2118 B).
*	No. 192	Cross, Sir William, Bart., of Scatwell, Muir of Ord, "Scatwell Belinda" (2162 B).
*	No. 191	Cross, Sir William, Bart., of Scatwell, Muir of Ord, "Scatwell Cherry Blossom" (2716 B).

HIGHLAND.

Class 34. HEIFER, born in 1929.—Premiums, £10, £5, £3, and £2.

1st	No. 220	Nelson, Thomas E., of Achnacloich, Connel, Argyll, "Maireared VI. of Achnacloich" (10,390).
2nd	No. 219	Maitland, Brig.-General J. D. Heriot, C.M.G., D.S.O., of Errol, Errol Park, Errol, "Almira III. of Errol" (10,264).
*	No. 221	Southesk, The Earl of, Kinnaird Castle, Brechin, "Lady Mairi" (10,509).
*	No. 216	Home, The Earl of, K.T., Douglas Castle, Douglas, Lanarkshire, "An-t-Uramach Morag" (10,395).
3rd	No. 217	Home, The Earl of, K.T., Douglas Castle, Douglas, Lanarkshire, "An-t-Uramach Tangy" (10,396).
4th	No. 218	Home, The Earl of, K.T., Douglas Castle, Douglas, Lanarkshire, "Ban Righ Subhach" (10,397).

The animals failing to qualify are marked thus (*).

STATE OF THE FUNDS

OF

THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND

As at 30th NOVEMBER 1933

I. **British Government Securities**—						
£19,300 3½ per cent War Loan, at 100¼ . . .				£19,348	5	0
£1,679, 13s. 4d. 2½ per cent Consolidated Stock, at 74 .				1,242	19	0
£8,000 4½ per cent Conversion Stock, at 109 x.d. . .				8,720	0	0
£6,200 3 per cent Local Loans, at 86¾				5,378	10	0
£4,000 3½ per cent Conversion Stock, at 100¾ . . .				4,030	0	0
				£38,719	14	0
II. **Heritable Bonds**—						
£12,500 at Commissioners' Rates				12,500	0	0
III. **Railway Debenture and Preference Stocks**—						
£17,050 London and North-Eastern Railway Co. 3 per cent Debenture Stock, at 76 .	£12,958	0	0			
£11,554 Do. do. 4 per cent do., at 100	11,554	0	0			
£16,105 London Midland and Scottish Railway Co. 4 per cent Debenture Stock, at 100½	16,185	10	6			
£1,500 Do. do. 4 per cent Preference Stock, at 69 . . .	1,035	0	0			
£703 Southern Railway Co. 4 per cent Debenture Stock, at 104	731	2	5			
£450 Do. do. 5 per cent Preference Stock, at 105½	474	15	0			
£112 Do. do. 5 per cent Guaranteed Stock, at 118½	132	14	5			
				43,071	2	4
IV. **Bank Stocks**—						
£5,365 0 0 Royal Bank of Scotland, at 454	£24,357	2	0			
£2,218 16 5 Bank of England, at 348½ .	7,732	11	9			
£1,110 13 4 Bank of Scotland, at 450 .	4,998	0	0			
2,850 "B" Shares, Barclays Bank, at 66s. 9d.	9,511	17	6			
				46,599	11	3
V. **Colonial Government Stocks**—						
£2,500 Dominion of Canada Registered 3½ per cent Stock (1930-50), at 100 . .	£2,500	0	0			
£2,500 New South Wales Inscribed 5 per cent Stock (1935-55), at 103 . .	2,575	0	0			
£2,500 Natal Inscribed 3½ per cent Stock (1914-39), at 101	2,525	0	0			
£2,000 Western Australia Inscribed 4 per cent Stock (1942-62), at 102 . .	2,040	0	0			
£2,000 New Zealand Government 5 per cent Inscribed Stock (1946), at 111 . .	2,220	0	0			
£1,120 Victorian Government 3½ per cent Inscribed Stock (1929-49), at 98 .	1,097	12	0			
				12,957	12	0
Carry forward . .				£153,847	19	7

Brought forward .				£153,847	19	7
VI. TEMPORARY LOAN—						
£5,500 on Loan to Edinburgh Corporation				5,500	0	0
VII. ESTIMATED VALUE of Building— 8 Eglinton Crescent	£5,000	0	0			
VIII. ESTIMATED VALUE of Furniture, Paintings, Books, &c.	1,500	0	0			
				6,500	0	0
IX. ARREARS OF SUBSCRIPTIONS considered recoverable . .				362	2	0
X. BALANCES at 30th November 1933				1,183	1	6
AMOUNT OF GENERAL FUNDS .				£167,393	3	1
XI. SPECIAL FUNDS—						
TWEEDDALE GOLD MEDAL FUND—						
£605 London and North-Eastern Railway Co. 4 per cent Debenture Stock, at 100				£605	0	0
£100 3 per cent Local Loans Stock, at 86¾				86	15	0
				£691	15	0
FIFE AND KINROSS PERPETUAL GOLD CHALLENGE CUP FUND—						
£268 London and North-Eastern Railway Co. 3 per cent Debenture Stock, at 76	£203	13	7			
£201 Do. do. 4 per cent First Guaranteed Stock, at 91½	183	18	4			
Sum on Deposit Receipt with British Linen Bank	41	14	6			
				429	6	5
PAISLEY PERPETUAL GOLD CHALLENGE CUP FUND—						
£802 London and North-Eastern Railway Co. 3 per cent Debenture Stock, at 76	£609	10	5			
Sum on Deposit Receipt with British Linen Bank	90	14	4			
				700	4	9
RENFREWSHIRE PERPETUAL GOLD CHALLENGE CUP FUND—						
£668 London and North-Eastern Railway Co. 3 per cent Debenture Stock, at 76	£507	13	7			
Sum on Deposit Receipt with British Linen Bank	83	14	9			
				591	8	4
WILLIAM TAYLOR MEMORIAL PRIZE FUND—						
£401 London and North-Eastern Railway Co. 3 per cent Debenture Stock, at 76	£304	15	2			
Sum on Deposit Receipt with British Linen Bank	70	5	10			
				375	1	0
WILLIAM DUTHIE PERPETUAL SILVER CHALLENGE CUP FUND—						
£260 2½ per cent Consolidated Stock, at 74 . . .				192	8	0
THE JAMES ARCHIBALD PRIZE—						
£612, 1s. 6d. 3½ per cent War Loan, at 100¼ . .				613	12	1
BALANCES WITH BRITISH LINEN BANK at 30th November 1933				145	7	7
AMOUNT OF SPECIAL FUNDS . .				£3,739	3	2

EDINBURGH, *3rd January* 1934.—As Auditor of the Highland and Agricultural Society of Scotland, I have examined the Securities for the Investments as detailed in the above States of Funds and have found them in order. The Titles to the Heritable Estate and the Bonds for Sums lent on Heritable Security are certified by the Society's Law Agents to be in order.
GEO. JAMES GREGOR, C.A.

RALPH ANSTRUTHER, *Treasurer.*
ALEXANDER MURDOCH, *Chairman.*

EDINBURGH, *10th January* 1934.

ABSTRACT of the ACCOUNTS of the HIGHLAND and

CHARGE.

1. BALANCES as at 30th November 1932				£1,132	13	2
2. ARREARS of Subscriptions outstanding at 30th November 1932	£352	7	6			
Whereof due by Members who have compounded for life, and whose arrears are thereby extinguished	9	0	0	343	7	6
3. INTERESTS AND DIVIDENDS—						
(1) Interests—						
On Heritable Bonds, less Income-tax	£398	8	9			
On Railway Debenture and Preference Stocks, do.	1,289	6	0			
On Colonial Government Stocks, do.	389	8	0			
On Annuity Stock, do.	12	0	0			
On British Government Stocks, do.	1,366	4	11			
On Temporary Loans, do.	17	14	9			
	£3,473	2	5			
(2) Dividends on Bank Stocks, less Income-tax	1,305	10	2	4,778	12	7
4. SUBSCRIPTIONS—						
Annual Subscriptions	£2,532	13	6			
Life Subscriptions	831	2	0	3,363	15	6
5. 'TRANSACTIONS'—Sales and Advertisements				45	5	3
6. INCOME-TAX repaid for year to 5th April 1933				1,382	15	1
7. BALANCE of Receipts from Inverness Show, 1932				171	14	8
8. BALANCE of Receipts from former Shows				9	19	2
9. RECEIPTS from Dundee Show, 1933				20,685	16	7
10. WARBLE FLY INVESTIGATION, 1932				11	10	0
11. N.D.D. EXAMINATION at Kilmarnock, 1932—Refund of Expenses				255	17	6
12. EDINBURGH and Leith Corporation Gas Annuities repaid				912	0	0
13. MISCELLANEOUS				0	10	0
SUM OF CHARGE				£33,093	17	0

EDINBURGH, 3*rd January* 1934.—As Auditor of the Highland and Agricultural
of the Society for the year ending 30th November 1933 and have found them to be
Accounts I have prepared an Account of Charge and Discharge of the Intromissions
1933, of which the above is an Abstract.

EDINBURGH, 10*th January* 1934.

AGRICULTURAL SOCIETY of SCOTLAND for Year 1932-1933.

DISCHARGE.

1.	ESTABLISHMENT EXPENSES—		
	Salaries and Wages and Allowance for Cleaning		£3,085 3 8
	Allowances to Mrs Simpson and Mrs Cowie		130 0 0
	Feu-duty, £21, 17s. 7d.; Rates and Taxes, £118, 6s. 0d.		140 3 7
	Coal, Gas, and Electric Light		67 4 9
	Insurances, £65, 19s. 1d.; Special Annuity Premium, £51, 3s. 9d.; Telephone and Telegrams, £76, 1s. 2d.; Repairs and Furnishings, £54, 7s. 11d.		247 11 11
			£3,670 3 11
2.	FEE to Auditor of Accounts for 1931-1932		120 0 0
3.	EDUCATION—		
	N.D.A. Examination		87 2 10
4.	CHEMICAL DEPARTMENT—		
	Fee to Chemist	£100 0 0	
	Analyses for Members and Expenses	299 17 0	
			399 17 0
5.	VETERINARY DEPARTMENT—Medals to Students		19 8 6
6.	DAIRY DEPARTMENT—N.D.D. Examination, 1932		133 4 0
7.	DAIRY DEPARTMENT, 1933—		
	Expenses of N.D.D. Examination held at Ayr	£314 19 0	
	Less Entry Fees	88 4 0	
			226 15 0
8.	WARBLE FLY INVESTIGATION—		
	Balance of Expenses, 1932	£3 18 11	
	Expenses, to account, for 1933	11 3 3	
			15 2 2
9.	INVESTIGATION of Poisonous Substances in Feeding-Stuffs on Live Stock		23 13 0
10.	EXPENSES attending New Implement Trials		0 12 0
11.	EXPENSES in connection with £1000 Prize for New Implement		92 19 9
12.	SOCIETY'S 'TRANSACTIONS'		1,549 17 4
13.	ORDINARY Printing, £277, 16s. 7d.; Advertising, £51, 18s.; Stationery, Books, &c., £214, 13s. 5d.; Postages and Receipt Stamps, £120, 17s. 4d.		665 5 4
14.	SALARY to Consulting Engineer		250 0 0
15.	TEMPORARY Loan	£8,500 0 0	
	Less Repaid	3,000 0 0	
			5,500 0 0
16.	MISCELLANEOUS Payments		269 14 0
17.	BALANCE of Expenses in connection with 100th Show, Edinburgh, 1931		0 10 0
18.	BALANCE of Expenses in connection with Inverness Show, 1932		173 5 0
19.	EXPENSES in connection with Dundee Show, 1933—		
	Premiums, £3609, 18s. 4d.; Medals, £161, 7s.; Expenses of Show, £11,964, 2s. 6d. (as per page 495)		15,825 7 10
20.	PREMIUMS and Medals for Local Shows and District Competitions		862 9 4
21.	CERTIFICATES and Medals for Long Service		136 0 10
22.	EXPENSES in connection with visiting sites for future Shows and attending Meetings		51 8 2
23.	SPECIAL GRANTS—		
	Animal Diseases Research Association, £200; Glasgow Veterinary College, £100; Scottish Agricultural Organisation Society, £100; other Grants, £45, 5s.		445 5 0
24	Cost of £215 Stock of the Royal Bank of Scotland		918 14 0
25.	ARREARS removed from Subscription List at 30th November 1933		111 18 6
26.	ARREARS of Subscriptions outstanding at 30th November 1933		362 2 0
27.	BALANCES at 30th November 1933—		
	On Account Current with Royal Bank of Scotland—		
	Edinburgh Account	£979 12 0	
	London Account	203 1 8	
		£1,182 13 8	
	In hands of Secretary	0 7 10	
			1,183 1 6
	SUM OF DISCHARGE		£33,093 17 0

Society of Scotland, I beg to report that I have examined the Books and Accounts
correctly stated and sufficiently vouched and instructed. From the Books and
of the Treasurer with the Funds of the Society for the year ending 30th November

GEO. JAMES GREGOR, C.A.

RALPH ANSTRUTHER, *Treasurer*.
ALEXANDER MURDOCH, *Chairman*.

ABSTRACT of the ACCOUNTS

CHARGE.

1. Local Subscriptions—Town Council of the City of Dundee		£1,000 0 0
2. Amount Collected during Show—		
Gates	£9,789 4 1	
Grand Stand	2,075 7 6	
Catalogues and Awards	604 18 9	
Tickets sold	24 10 6	
Chauffeurs' Tickets	28 3 0	
Cloak-Rooms and Lavatories	169 10 6	
		12,691 14 4
3. Forage Sold		2 13 5
4. Rent of Stalls—		
Implement and other Exhibits	£3,345 2 6	
Stock Exhibits	2,171 11 6	
		5,516 14 0
5. Rent of Refreshment Booths		700 0 0
6. Advertisements in Catalogue and Premium List		464 12 7
7. Subscriptions in Aid of Premiums		290 11 0
8. Miscellaneous		19 11 3
		£20,685 16 7

Note.—From the credit balance of	£4,881 17 1
Deduct Premiums undrawn at 30th November 1933	224 10 0
	£4,657 7 1
To the above balance there falls to be added sums due by Exhibitors for fitting up of stands, &c., amounting to	156 5 6
Making the probable surplus	£4,813 12 7

Edinburgh, 10*th January* 1934.

of the DUNDEE SHOW, 1933.

DISCHARGE.

1. SHOWYARD—		
Fitting up of Showyard		£3,600 0 0
Bell & Sime Ltd.—Hire of Timber		1,664 19 6
Rosettes, £40, 9s. 4d.; Penning and Cartage Charges on Poultry and Rabbits, £48, 5s.; Horse-Shoeing, £20, 7s. 5d.; Buttermaking, £57, 1s. 9d.; Sheep Dog Demonstration, £12, 10s.; Hire of Chairs, £25; Flower Baskets, £7, 2s. 6d.; Direction Posts and Signs, £11, 3s. 9d.	£221 19 9	
Hire of Sleepers and Cartage, £101, 19s. 6d.; Office Luggage, £10, 19s. 10d.; Toilet Requisites, &c., £10, 4s. 3d.; Miscellaneous, £7, 10s 10d.	130 14 5	352 14 2
Salary to John Reid, Showyard Erector		500 0 0
		£6,117 13 8
2. FORAGE and Bedding for Stock		400 1 0
3. POLICE		133 2 0
4. TRAVELLING EXPENSES of Judges, Stewards, and Staff		316 4 3
5. HOTELS AND LUNCHEONS—		
Hotels for Directors, Stewards, and Judges	£256 18 0	
Luncheons in Royal Pavilion, and for Directors, Judges, Attending Members, Pressmen, Staff (including accommodation), Breakfasts, and Teas	522 15 11	779 13 11
6. ASSISTANTS and Show Staff		617 9 3
7. MUSIC		233 1 0
8. PRINTING, Members' Badges, Stationery, &c.		1,585 7 0
9. ADVERTISING and Bill-posting		1,108 19 9
10. FORESTRY Exhibition, £40; Horticultural Section, £53, 15s. 9d.; Concert for Attendants, £6, 8s. 8d.		100 4 5
11. VETERINARY INSPECTOR		21 0 0
12. SHOW TREASURER		100 0 0
13. POSTAGES		135 8 2
14. POST OFFICE and Telephones		60 3 8
15. AMBULANCE		20 1 7
16. INSURANCE		92 4 9
17. MISCELLANEOUS		143 8 1
		£11,964 2 6
18. PREMIUMS drawn at 30th November 1933		3,839 17 0
		£15,803 19 6
CREDIT BALANCE		4,881 17 1
		£20,685 16 7

RALPH ANSTRUTHER, *Treasurer.*
ALEXANDER MURDOCH, *Chairman.*
GEO. JAMES GREGOR, C.A., *Auditor.*

ABSTRACT of the ACCOUNTS of the

CHARGE.

I. **Funds as at 30th November 1932—**			
£3,193 London and North-Eastern Railway Company 3 per cent Debenture Stock			£2,650 0 0
£5,551, 16s. 3d. 3½ per cent Conversion Stock . . .			4,216 18 2
£500 Queensland 3½ per cent Inscribed Stock, 1950-70 . .			450 1 0
£412 London Midland and Scottish Railway Company 4 per cent Debenture Stock			611 10 6
£190 London Midland and Scottish Railway Company 4 per cent Guaranteed Stock			259 1 11
			£8,187 11 7
Balance on Account Current with Royal Bank of Scotland . .			289 0 11
			£8,476 12 6
II. **Interest on Investments—**			
On £3,193 London and North-Eastern Railway Company 3 per cent Debenture Stock, for year to 30th June 1933		£95 15 10	
Less tax		23 19 0	
		£71 16 10	
On £5,551, 16s. 3d. 3½ per cent Conversion Stock, for year to 1st October 1933 .	£194 6 2		
Less tax . . .	48 11 6		
		145 14 8	
On £500 Queensland 3½ per cent Inscribed Stock, 1950-70, for year to 30th June 1933	£17 10 0		
Less tax . . .	4 7 6		
		13 2 6	
On £412 London Midland and Scottish Railway Company 4 per cent Debenture Stock, for year to 30th June 1933 . .	£16 9 6		
Less tax . . .	4 2 4		
		12 7 2	
On £190 London Midland and Scottish Railway Company 4 per cent Guaranteed Stock, for year to 30th June 1933 .	£7 12 0		
Less tax . . .	1 18 0		
		5 14 0	
			248 15 2
III. **Income-tax** repaid for year to 5th April 1933 . . .			82 18 4
Sum of Charge . .			£8,808 6 0

Edinburgh, 10*th January* 1934.

ARGYLL NAVAL FUND for the Year 1932-1933.

DISCHARGE.

I. **Allowances** to the following eight Recipients—

W. J. R. Campbell (tenth year)	£40	0	0
M. W. G. Webster (eighth year)	40	0	0
J. H. Dundas (fourth year)	40	0	0
K. C. Grieve (fourth year)	40	0	0
D. B. N. Mellis (fourth year)	40	0	0
J. L. Hallewell (third year)	20	0	0
D. V. Hugonin (third year)	40	0	0
C. D. Madden (first year)	40	0	0
	£300	0	0

II. Miscellaneous—

Henry Munro Ltd.—Advertising	£19	10	6			
Geo. Waterston & Sons—Stationery	1	7	0	20	17	6

III. Funds at 30th November 1933—

£3,193 London and North-Eastern Railway Company 3 per cent Debenture Stock	£2,650	0	0
£5,551, 16s. 3d. 3½ per cent Conversion Stock	4,216	18	2
£500 Queensland 3½ per cent Inscribed Stock, 1950-70	450	1	0
£412 London Midland and Scottish Railway Company 4 per cent Debenture Stock	611	10	6
£190 London Midland and Scottish Railway Company 4 per cent Guaranteed Stock	259	1	11
	£8,187	11	7

Note.—The above Funds are entered at cost price. The market value at 30th November 1933 was £9103, 14s. 10d.

Balance on Account Current with Royal Bank of Scotland	299	16	11			
				8,487	8	6
Sum of Discharge				£8,808	6	0

RALPH ANSTRUTHER, *Treasurer.*
ALEXANDER MURDOCH, *Chairman.*
GEO. JAMES GREGOR, C.A., *Auditor.*

VIEW OF RECEIPTS AND PAYMENTS for the Year 1932-1933.

RECEIPTS.

		£	s.	d.	£	s.	d.
1.	Annual Subscriptions and Arrears received				£2,402	0	6
2.	Life Subscriptions				831	2	0
3.	Interests and Dividends—						
	Interests	£3,473	2	5			
	Dividends	1,305	10	2			
					4,778	12	7
4.	'Transactions'—Sales and Advertisements				45	5	3
5.	Income-tax repaid for year to 5th April 1933				1,382	15	1
6.	Balance of Receipts from Inverness Show, 1932				171	14	8
7.	Balance of Receipts from former Shows				9	19	2
8.	Receipts from Dundee Show, 1933				20,685	16	7
9.	Warble Fly Investigation, 1932				11	10	0
10.	N.D.D. Examination at Ayr, 1932—Refund of Expenses				255	17	6
11.	Miscellaneous				0	10	0
					£30,575	3	4

PAYMENTS.

		£	s.	d.	£	s.	d.	£	s.	d.
1.	Establishment Expenses—									
	Salaries and Wages and Allowance for Cleaning				£3,085	3	8			
	Retiring Allowances				130	0	0			
	Feu-duty, Taxes, Coal, Gas and Electric Light, Insurance, Repairs, and Furnishings				455	0	3			
					£3,670	3	11			
2.	Fee to Auditor of Accounts, 1931-1932				120	0	0			
3.	Education—N.D.A.				87	2	10			
4.	Chemical Department				399	17	0			
5.	Veterinary Department				19	8	6			
6.	Dairy Department—N.D.D. Examination, 1932				133	4	0			
7.	Dairy Department—N.D.D. Examination, 1933				226	15	0			
8.	Society's 'Transactions'				1,549	17	4			
9.	Warble Fly Investigation, 1933				15	2	2			
10.	Investigation of Poisonous Substances in Feeding-Stuffs on Live Stock				23	13	0			
11.	Expenses attending New Implement Trials				0	12	0			
12.	Expenses—£1000 Prize for New Implement				92	19	9			
13.	Ordinary Printing, Advertising, Stationery, Books, and Postages				665	5	4			
14.	Salary to Consulting Engineer				250	0	0			
15.	Miscellaneous Payments				269	14	0			
16.	Balance of Payments on account of 100th Show, Edinburgh, 1931				0	10	0			
17.	Balance of Payments on account of Inverness Show, 1932				173	5	0			
18	Payments on account of Dundee Show, 1933—									
	1. Premiums and Medals	£3,861	5	4						
	2. Expenses	11,964	2	6						
					15,825	7	10			
19.	Premiums and Medals for Local Shows and District Competitions				862	9	4			
20.	Certificates and Medals for Long Service				136	0	10			
21.	Expenses in connection with visiting Sites for future Shows and attending Meetings				51	8	2			
22.	Special Grants— Animal Diseases Research Association, £200; Glasgow Veterinary College, £100; Scottish Agricultural Organisation Society, £100; other Grants, £45, 5s.				445	5	0			
								25,018	1	0
	Balance of Receipts							£5,557	2	4

RALPH ANSTRUTHER, *Treasurer.*
ALEXANDER MURDOCH, *Chairman.*
GEO. JAMES GREGOR, C.A., *Auditor.*

Edinburgh, 10*th January* 1934.

PROCEEDINGS AT BOARD MEETINGS.

MEETING OF DIRECTORS, 5TH APRIL 1933.

Mr **Alexander Murdoch**, East Hallside, Cambuslang, Lanarkshire, in the Chair.

Present.—Vice-President—Lord Provost William H. Buist, O.B.E., Dundee. *Ordinary Directors*—Mr George Buchanan; Mr Ian M. Campbell; Mr James Durno; Mr Thomas Elder; Captain Thomas Elliot; Mr W. P. Gilmour; Mr William Henderson; Mr John Hewetson; Mr Robert Macmillan; Mr Robert Miller; Mr Gavin Ralston; Mr John M. Roger; Mr J. P. Ross-Taylor; Mr T. Mercer Sharp; Major R. W. Sharpe; Mr John P. Sleigh; Major S. Strang Steel; Mr T. G. Wilson; Mr James Wyllie. *Extraordinary Directors*—Mr Alexander Batchelor; Mr J. Belfrage Black; Mr F. W. Christie; Mr Thomas Clark; Mr George Grant; Mr William C. Hunter; Mr James R. Lumsden; Mr William Meiklem; Mr Alexander Murdoch; Mr Robert Park; Mr Andrew Pollock; Mr John W. Prentice; Lord Rowallan, M.C.; The Hon. Walter T. H. Scott. Master of Polwarth; Mr Thomas Templeton; Mr William Tod; Mr Archibald Whyte. *Treasurer*—Sir Ralph Anstruther of Balcaskie, Bt. *Honorary Secretary*—Colonel F. J. Carruthers of Dormont. *Consulting Engineer*—Professor R. Stanfield, A.R.S.M., &c.

The late Mr John Stewart of Struthers.

Before proceeding with the business of the Meeting, the Chairman referred, with very deep regret, to the death of an esteemed member of that Board, Mr John Stewart of Struthers. Mr Stewart, he said, was a member of the Society for close on thirty years, and a Director for a period of six years—from 1923 to 1928. He was an Extraordinary Director that year, as representing a part of the Division in which the Show was to be held. Mr Stewart took a deep practical interest in the affairs of the Society. He was a keen and successful breeder of various classes of live stock, and was a regular exhibitor at the Society's Shows.

Mr Stewart was one of the best-known farmers in the county of Fife, where he owned land and farmed on an extensive scale. He took an active part in the work of local government in the county, where he was associated with many public bodies, being particularly interested in matters pertaining to Agriculture and Agricultural Education. His quiet and genial personality secured the esteem of all with whom he was associated, and his death was a loss to Agriculture, and to that Society, which they deeply deplored.

A Minute of regret and sympathy was submitted and adopted, the Members present upstanding, and the Secretary was instructed to forward a copy to Mrs Stewart and the family of the deceased.

Council of Agriculture for England and Wales.

A letter was read from the Department of Agriculture for Scotland, intimating that the Secretary of State for Scotland had nominated Mr W. P. Gilmour, Balmangan, Kirkcudbright, to serve, as from 1st December last, for a further period of four years, as a member of the Agricultural Advisory Committee of the Council of Agriculture for England and Wales.

Dundee Show, 1933.

Royal Visit.—Minutes of Meetings of Special Committee, dated 7th March and 5th April, were read and approved.

The Minute of 7th March stated that telegrams had been received from Rear-Admiral Brooke, Comptroller to H.R.H. The Duke of York, informing the Directors that Their Royal Highnesses The Duke and Duchess of York had been compelled to make a change in their arrangements, and now proposed to visit the Show on Thursday and Friday, the 22nd and 23rd June. The Committee had drafted a suggested programme for the visit, and this was being submitted to Their Royal Highnesses for approval.

As a result of the alteration in the days of the Royal visit, it was suggested that the General Meeting of Members be held on the Thursday, instead of the Wednesday, that the Stock Judging Competition be transferred from the Thursday to the Wednesday, that Horses in Harness be judged on Wednesday afternoon, instead of in the forenoon, and that other minor alterations be made in the Programme of the Show, to fit in with the details of the Royal visit.

Horticultural Section.—It was reported that the Royal Caledonian Horticultural Society had again kindly agreed to lend the staging for the Horticultural Section, free of charge, and the Secretary was instructed to convey to that Society the cordial thanks of the Directors.

It was also reported that an offer had been received from Messrs Mackenzie & Moncur, Limited, to transport, erect, and remove the staging at a total cost of £35, and it was decided that this offer be accepted.

Showground.—An offer by Scottish Agricultural Industries, Limited, Dundee, to treat the turf within the Main Square of the Showyard with fertilisers, in order to produce a good surface with a fresh green appearance, was submitted. The Secretary was instructed to thank Scottish Agricultural Industries for the offer, which the Directors had pleasure in accepting.

Glasgow Show, 1934.

The Meeting considered the date of the Show to be held next year at Glasgow. After a discussion, it was moved by the Chairman, seconded by Mr Thomas Elder of Stevenson, and unanimously agreed to, that the Show be held towards the end of June. A decision as to the actual dates was deferred until next Meeting, when it was expected the date of the Royal Show would be known. It was agreed that it was desirable that a clear week should intervene between this Society's Show and that of the Royal Society.

Damage by Trespass.

A letter was read from the Scottish Land and Property Federation, forwarding copy of Suggestions approved at a Conference held on 21st February, as revised by a Sub-Committee on 7th March. It was stated that a further Meeting of the Conference would be held at an early date.

Colonel F. J. Carruthers of Dormont, one of the Society's representatives at the Conference, reported shortly on the proceedings. The decisions come to were that Clubs, such as the Mountaineering Club, Hostel's Association, &c., should be communicated with, asking them to use their influence in educating the general public to show due regard to the rights of owners of private property. The Railway and Bus Companies had been written to asking them to put up notices on their premises, and in their vehicles, cautioning people not to do damage to property, nor to cause injury by fire. The Secretary of State for Scotland was to be asked to receive a deputation from the Societies, with a view to tightening up the law in regard to trespass, the lighting of fires, and the licensing and control of dogs ; and he was also to be asked to authorise owners and occupiers of land to shoot any dog which was actually caught in the act of chasing their stock. It was also proposed that the sum payable for dog licences should be increased, and considerably more control exercised over exemptions. Another proposal was that it should be an offence, subject to a fine, to leave bottles, tins, or other litter lying on the land. The idea they wanted to put before the Secretary of State for Scotland was that the law required strengthening in these respects, so that a prosecution could be taken by the police without an owner or occupier having to take civil action. These proposals had been submitted to all the bodies who sent representatives to the recent Conference, and he understood they had all agreed to them.

They had been considered by the Society's Finance and Law Committee that forenoon, and the Committee had agreed to recommend that the Directors approve generally of the proposals.

£1000 *Prize for New Implement.*

The Secretary reported that the Judges had commenced their inspection of the Implements entered for the above Prize. In the course of that week they were visiting various places in the Lothians, Lanarkshire and Ayrshire, and would inspect ten out of the twenty-one Implements entered. Next week they were proceeding to Yorkshire to inspect a Motor Spade Digger at Filey.

Dundee Show, 1933.

Catering.—Minutes of Meetings of the Catering Committee, dated 1st March and 4th April, were submitted and approved.

The Minutes recommended the appointment of the following three Licensed Caterers :—

The Royal Athenæum, Ltd., Aberdeen.
Messrs M. Mitchell & Co., Ltd., 2 Gloucester Place, Edinburgh.
Caledonian Hotel, Ltd., Union Terrace, Aberdeen.

With regard to the appointment of a fourth Licensed Caterer, two names were put forward—viz., E. Pfeiffer, 82 Great King Street, Edinburgh ; and P. T. Ferguson, Imperial Restaurant, Dumfries.

As the Convener of the Committee was unavoidably absent, and only three members were present at the Meeting on 4th April, it was thought desirable to leave the selection of the fourth Caterer to the Board of Directors, and this course was adopted.

On a vote being taken, Mr E. Pfeiffer was appointed by 20 votes to 15.

Directors Exhibiting Stock.

On the Motion of the Chairman, it was unanimously agreed to suspend the Standing Orders in order to permit of consideration of the following Motion.

Mr Ian M. Campbell, Bal Blair, Invershin, then moved :—

> "That Directors of the Society should not enter the Judging Rings, in charge of or in attendance on their Stock, during the time that judging is taking place."

The Motion was seconded by Mr George Grant, Glenfarclas, and unanimously agreed to.

MEETING OF DIRECTORS, 3RD MAY 1933.

Mr ALEXANDER MURDOCH, East Hallside, Cambuslang, Lanarkshire, in the Chair.

Present.—Ordinary Directors—Mr James P. Brown ; Mr George Buchanan ; Mr Ian M. Campbell ; Mr Alexander Clark ; Mr John E. B. Cowper ; Mr James Durno ; Mr Thomas Elder ; Captain Thomas Elliot ; Mr Alexander Forbes ; Mr W. P. Gilmour ; Mr John Hewetson ; Mr J. E. Kerr ; Mr James Kilpatrick ; Mr James M'Laren ; Mr Robert Miller ; Mr Gavin Ralston ; Mr John M. Roger ; Mr J. P. Ross-Taylor ; Mr T. G. Wilson. *Extraordinary Directors*—Mr Alexander Batchelor ; Mr J. Belfrage Black ; Mr F. W. Christie ; Mr Thomas Clark ; Mr William C. Hunter ; Mr James R. Lumsden ; Mr Alexander Murdoch ; Mr Robert Park ; Mr John W. Prentice ; The Hon. Walter T. H. Scott, Master of Polwarth ; Mr Thomas Templeton ; Mr William Tod ; Mr Archibald Whyte. *Treasurer*—Sir Ralph Anstruther of Balcaskie, Bt. *Honorary Secretary*—Colonel F. J. Carruthers of Dormont. *Consulting Engineer*—Professor R. Stanfield, A.R.S.M., &c.

Dundee Show, 1933.

Catering.—A Minute of Meeting of Catering Committee, dated 3rd May, was submitted and approved.

The Minute recommended that the Unlicensed Catering Stand be placed in the hands of Mr J. R. Ingram of Dundee and Broughty Ferry, and that the Catering in the Directors' Luncheon Room be entrusted to the Caledonian Hotel, Aberdeen.

Tomato Competition.—It was agreed to grant permission to the Department of Agriculture for Scotland to hold a Competition in the Showyard, on the same lines as at recent Shows, in connection with the Scottish National Mark Scheme for Tomatoes.

Milking Competition for Goats.—A letter was read from the Edinburgh and East of Scotland College of Agriculture, agreeing to grant the assistance of the County Organiser, Miss Watson, in connection with the Milking Competition for Goats, and also the services of their Chemical Department in analysing and reporting on the samples of milk.

It was agreed that the College Authorities be thanked for their promised assistance.

Glasgow Show, 1934.

The Chairman stated that, since last Meeting, a communication had been received from the Royal Agricultural Society of England to the effect that the date of the Royal Show at Ipswich next year had been fixed for 3rd to 7th July. In view of that fact, he moved that the Society's Show at Glasgow next year be held from the 19th to the 22nd June, and this was unanimously agreed to.

Revision of Bye-Laws.

The Finance and Law Committee reported that, on 1st May 1929, the Directors agreed to remit to a Sub-Committee to discuss, with the Society's Law Agents, necessary alterations in the Bye-Laws. A Memorandum dealing fully with the subject was prepared by the Law Agents. After consideration of the Memorandum in detail, the Sub-Committee suggested the following alterations and additions, and these had been considered by the Finance and Law Committee, which had agreed to recommend their adoption:—

Bye-Law 2.—That the words "Grain, Seed and Manure Merchants" be introduced after the words "Agricultural Implement Makers" in line 5.

The following new Bye-Law to follow Bye-Law 2:—

"3. Any ordinary Member of the Society who has paid an annual subscription for a period of not less than forty years, and who has intimated to the Society the desire to be relieved of further annual payments, shall be admitted by the Board of Directors as a Life Member without further payment."

The following new Bye-Laws to follow Bye-Law 4:—

"New Members shall not be entitled to vote on any question which may arise at the Meeting at which such new Members are elected." (*If adopted, this will become Bye-Law* 6.)

"Twenty Members personally present shall be a quorum for a General Meeting, and no business shall be transacted at any General Meeting unless the quorum requisite be present at the commencement of the business. If within half an hour from the time appointed for the Meeting, a quorum is not present, the Meeting, if an occasional General Meeting convened by the Directors, shall be dissolved, but in any other case it shall stand adjourned to such day, time and place as the Directors may decide, and if at such adjourned Meeting a quorum is not present, any ten Members who are personally present shall be a quorum and may transact the business for which the Meeting was called." (*If adopted, this will become Bye-Law* 7.)

Bye-Law 11.—That the words "the President, a Vice-President, the Treasurer, Honorary Secretary, or" be introduced between the words "retirement of" and "a Director" in line 2; that the words "President, Vice-President, Treasurer, Honorary Secretary, or" be introduced between the words "and the" and "Director" in line 4; that the word "retiring" be deleted in line 5, and that the words "official or" be introduced before the words "Director whose vacancy he fills" occurring in the same line. (*If adopted, this will become Bye-Law* 14.)

Bye-Law 16.—*That this Bye-Law be deleted, and the following new Bye-Laws be substituted therefor* :—

"19. At General Meetings of the Society no motion shall be submitted or entertained for immediate decision, unless notice thereof has been given two weeks previously to the Board of Directors, without prejudice, however, to the competency of a motion of which due notice has not been given being remitted to the Directors for consideration and thereafter being disposed of at a future General Meeting."

"20. All Notices of motions shall be dated as received and shall be entered by the Secretary upon the Agenda Paper containing a note of the business to be considered at such General Meetings."

"21. Where an amendment is made on a motion, the vote shall be taken between the motion and the amendment. When there is more than one amendment, the amendment last proposed shall be put against that immediately preceding, and the one which is carried shall be put against the next preceding, and so on until there remains only one amendment, between which and the original motion the vote shall be taken. If an amendment be carried, the motion amended shall take the place of the original motion, and shall become the question upon which any further amendment may be moved."

"22. Every question submitted to a General Meeting shall be decided in the first instance by a show of hands, or afterwards by a poll if duly demanded, and in the case of an equality of votes the Chairman shall, both on the show of hands and at the poll, have a casting as well as a deliberative vote."

"23. At any General Meeting, unless a poll is demanded immediately on the declaration of the result of the show of hands as provided for in the following Bye-Law, a declaration by the Chairman that a resolution has been carried or lost, and an entry to that effect in the book of proceedings of the Society, shall be conclusive evidence of the fact without proof of the number of the votes recorded in favour of or against such resolution."

"24. The Chairman shall be entitled to order a poll, and he shall do so if a poll is demanded by either at least five Directors or ten Members, and the poll shall be taken at such time and place as the Chairman of the Meeting directs, and either at the Meeting, or after an interval, or adjournment, or otherwise. If the Chairman directs that the poll is to be taken at the Meeting, the voting papers shall be in such form as he may determine, and one voting paper shall be handed to each Member present. If the Chairman directs that the poll shall be taken on a future day to be fixed by him, the voting papers shall also be in the form determined by him and shall be sent by post to every Member of the Society. The voting papers must be returned so as to be in the hands of the Secretary at least forty-eight hours before the date fixed for the poll. The result of the poll shall be deemed to be the Resolution of the Meeting at which the poll was demanded."

"25. The demand of a poll shall not prevent the continuance of a Meeting for the transaction of any business other than the question on which a poll has been demanded."

"26. The Board of Directors shall have power to determine from time to time whether any and, if so, what regulations in addition to those herein contained shall be prescribed as to admission to and voting at Meetings of the Society."

5th April 1933.

Mr Alexander Batchelor drew attention to the provision in the Royal Charter of 1834, whereby an Ordinary Member, who had not objected to his election, on the same being intimated to him by the Secretary, was not entitled to resign until he had paid a life subscription or an equivalent amount in annual subscriptions. That clause, he said, had been the means, in his own experience, of preventing a considerable number of people from joining the Society. He thought the provision was out of date, and should be altered.

Mr Batchelor also pointed out that there were a number of other classes of Agriculturists who were precluded from joining the Society on the lower rate of subscription. He instanced the case of Agricultural Auctioneers, Cattle Dealers, Butchers, Carting Contractors, Dairymen and Market Gardeners. He thought that those should be included, and suggested that the matter be remitted back to the Committee for further consideration.

A full discussion followed, in the course of which it was pointed out that the provision in the 1834 Charter could only be altered by a new Charter, which the Directors were not prepared to contemplate at the present time. With regard to certain classes being precluded from joining the Society on the lower rate, that could be dealt with in the Bye-Laws.

Mr Batchelor eventually moved that, in addition to " Grain, Seed and Manure Merchants," the words " Agricultural Auctioneers, Cattle Dealers " be introduced into Bye-Law 2, and this was agreed to.

On the motion of Sir Ralph Anstruther, Bt., the proposed alterations in and additions to the Bye-Laws, including the foregoing addition, were unanimously adopted.

Damage by Trespass.

Colonel F. J. Carruthers of Dormont, Lockerbie, reported on the proceedings at a further Conference regarding Damage by Trespass, held on 25th April. He stated that circular letters had been sent out to a number of Societies, such as the Mountaineering Association, the Boy Scouts' and Girl Guides' Associations, and favourable replies had been received. Suitable short notices had been drafted, and were being printed, for exhibition in buses and on railway premises, and the hope was expressed that the Society would contribute something towards the cost of printing.

It was proposed to hold another Conference on the 6th June, at which representatives of the various bodies to whom the circular had been sent would be invited to attend.

Double Dipping Regulations.

A letter was submitted from the Ministry of Agriculture and Fisheries, forwarding copy of a circular letter addressed by the Ministry, on 27th March last, to Local Authorities in England and Wales and Scotland, on the subject of the regulations regarding the dipping of sheep moved into England from Scotland. A copy of the Order referred to in the circular letters was also enclosed.

The Secretary pointed out that some months ago the Directors agreed to support a representation made by certain County Authorities in the Borders that the Ministry should endeavour to obtain a modification of the regulations passed by English County Authorities prescribing double dipping in the case of sheep imported from Scotland. It was pointed out that sheep scab had been reduced to such an extent in Scotland that these regulations were now unnecessary. The Ministry had replied that they were communicating with the Local Authorities with regard to the matter. They now wrote that they had replies from the Local Authorities in England, some of which had agreed to withdraw the regulations, but a considerable number had stated that their difficulty in withdrawing was that they had no assurance that sheep might not be brought into Scotland from some place which was not equally free of scab, and then moved from Scotland into England. That position had been emphasised by the fact that recently scab was discovered near Stirling, and in Dumbartonshire, which was found to have been brought there by sheep from Yorkshire. The result was that the Ministry had now passed an Order requiring that all sheep imported from England into Scotland must be double dipped before being brought into Scotland.

After some discussion, it was agreed, on the suggestion of the Chairman, that it be remitted to the Science Committee to watch the matter, and, if thought necessary, to bring forward a recommendation for future action.

Warble Fly Investigation.

A letter was submitted from the Leathersellers' Company's Warble Fly Committee, intimating that they were prepared to make a grant of one half the actual sum expended by the Society in conducting Demonstration Schemes and continuing the experiments in Scotland during the current year, such grant not to exceed a maximum of £50.

Glasgow Veterinary College.

An application from the Glasgow Veterinary College for a renewal for the current year of the grant of £100, which had been given for the past three years, was submitted.

On the recommendation of the Finance Committee it was decided that the application be granted.

Animal Diseases Research Association.

An application from the Animal Diseases Research Association for a renewal for the current year of the grant of £200, which had been given for the past seven years, was submitted.

On the recommendation of the Finance Committee it was decided that the application be granted.

Grants for Heavy Horse Breeding.

A letter was submitted from Mr Charles Milne, M.P., with regard to the discontinuance of the grants to smallholders for Heavy Horse Breeding, formerly given by the Department of Agriculture for Scotland, and inquiring as to the attitude of the Society with regard to this discontinuance.

Following a discussion, the Meeting expressed general agreement in favour of these grants being continued, the view being expressed that, while economies were desirable, they should not be made at the expense of the poorer class of agriculturists.

It was agreed to remit to the following small Committee to consider the matter and take such action as they consider desirable at the appropriate time—the Chairman, Treasurer and Honorary Secretary.

MEETING OF DIRECTORS, 7TH JUNE 1933.

Mr ALEXANDER MURDOCH, East Hallside, Cambuslang, Lanarkshire, in the Chair.

Present.—Ordinary Directors—Mr James P. Brown; Mr George Buchanan; Mr Ian M. Campbell; Mr Alexander Clark; Mr James Durno; Mr Thomas Elder; Captain Thomas Elliot; Mr Alexander Forbes; Mr W. P. Gilmour; Mr John Hewetson; Mr J. E. Kerr; Mr James Kilpatrick; Mr James M'Laren; Mr Robert Macmillan; Mr Alexander Munro; Mr Gavin Ralston; Mr T. Mercer Sharp; Major R. W. Sharpe; Mr John P. Sleigh; Mr A. A. Hagart Speirs; Captain John C. Stewart; Mr Phipps O. Turnbull; Mr T. G. Wilson; Mr James Wyllie. *Extraordinary Directors*—Mr J. Belfrage Black; Mr F. W. Christie; Mr Thomas Clark; Mr George Grant; Mr William C. Hunter; Mr James R. Lumsden; Mr William Meiklem; Mr Alexander Murdoch; Mr Robert Park; Mr Andrew Pollock; Mr John W. Prentice; Lord Rowallan; The Hon. Walter T. H. Scott, Master of Polwarth; Mr Thomas Templeton; Mr William Tod; Mr Archibald Whyte. *Treasurer*—Sir Ralph Anstruther of Balcaskie, Bt. *Honorary Secretary*—Colonel F. J. Carruthers of Dormont. *Chemist*—J. F. Tocher, D.Sc., F.I.C. *Consulting Entomologist*—R. Stewart MacDougall, M.A., D.Sc., LL.D.

Date of Annual Show.

A letter was submitted from the Society of Border Leicester Sheep Breeders, requesting the Directors to receive a joint deputation in July from the three Scottish Sheep Societies, the Scottish Section of the Suffolk Sheep Society and the Clydesdale Horse Society, regarding the protest made last year against the continuance of June as a fixed date for the Show.

The Chairman pointed out that, as the date of the Glasgow Show next year had already been fixed for June 19th to 22nd, there appeared to be no necessity to call a Special Meeting of the Directors in July.

It was accordingly decided that a reply be sent to the Border Leicester Sheep Breeders' Society that the proposed deputation would be received in November.

Resignation of Director.

A letter was read from Mr Falconer L. Wallace of Candacraig, in which he stated that he had reluctantly decided to retire from the Board of Directors, this resignation to take effect immediately after the forthcoming Show at Dundee.

The Chairman moved that, in accepting the resignation, the Secretary be instructed to express to Mr Wallace the regret of the Board of Directors that he should have found it necessary to resign, and their appreciation of his services to the Society during his term of office as a Director. This was unanimously agreed to.

Dundee Show, 1933.

Letter from Lord Provost Buist.—A letter was read from Lord Provost W. H. Buist, in which he stated that it would not be possible for him to attend the meeting that day, and he wished to take that opportunity of thanking the Chairman, Secretary and his fellow Directors for all their courtesy to him during the time he had been privileged to be associated with them. He trusted that the Show to be held that month in Dundee would be an outstanding success.

The Chairman said it was extremely gratifying to receive such a letter from Lord Provost Buist, and he expressed the Directors' appreciation of all that the Lord Provost and the City of Dundee had done, and were doing, to further the success of the Show.

Donation of £1000 from Corporation of Dundee.—The Secretary reported the receipt, on 27th May, of a cheque for £1000, being the sum which the Corporation of Dundee had agreed to contribute to the funds of the Show.

Royal Visit.—A Minute of Meeting of Special Committee, dated 7th June, was read and approved.

The Minute dealt with further arrangements for the visit of Their Royal Highnesses The Duke and Duchess of York on 22nd and 23rd June.

It was recommended that the Lord Provost, Magistrates and Council of the Corporation of Dundee be invited, as a body, to visit the Showyard on the Wednesday afternoon.

The Secretary had submitted the names of twelve holders of the Society's Long Service Certificate and Gold Medal for forty-five years' service and over, within the area of the Show. It was recommended that these be invited to attend at the Royal Pavilion at 11.15 A.M., on Friday, 23rd June, and that thereafter they be entertained to luncheon by the Society, and provided with seats in the Grand Stand.

Buttermaking Competition and Edinburgh Gold Cup.—In view of the illness of Mr William Burkitt, Grange Hill, Bishop Auckland, who had been appointed Judge of the Championship Section of the Buttermaking Competition, and also Judge of the animals competing for the Edinburgh Gold Cup, it was agreed to appoint the following to act in the event of Mr Burkitt being unable to officiate: Mr A. Y. Allan, Aitkenbar, Dumbarton, to award the points for inspection in connection with the Edinburgh Gold Cup, and Mr W. Smith, Naldera, Colinton, to carry out the Butter Fat Tests. Mr Smith would also act as Judge in the Championship Section of the Buttermaking Competition.

Sheep Dog Demonstration.—It was decided that Mr J. M. Wilson, Holmshaw, Moffat, be engaged to give a demonstration of Sheep Dog working in the Parade Ring on the Wednesday and Thursday evenings of the Show.

Visit of South African Farmers.—A letter was read from the British National Union with regard to a proposed visit of a party of South African farmers to the Show on Wednesday, the 21st June. The party would number about twenty.

It was agreed that the party be supplied with Visitors' Badges, entitling them to free admission to the Show and Grand Stand, and that Mr William C. Hunter of Arngask be appointed to receive them on their arrival at the Showyard, and to extend to them hospitality on behalf of the Society.

Aberdeen Show, 1935.

A Report of the Sites Committee, dated 7th June, was submitted and approved.

The Report stated that the Committee had visited Aberdeen on Friday, 2nd June, and inspected the site kindly offered by the Corporation of Aberdeen for the Show of 1935. The site consisted of an area of ground extending in all to sixty-eight acres or thereby, the use of which was offered by the Corporation from 1st March to 31st August 1935. This site was on the lands of Seaton, east of King Street, near the Bridge of Don. It was in permanent grass, within the city, and lay along a main tram route. It was about one and a half miles from the centre of the city, and a less distance from Kittybrewster Station, where stock and goods could be dealt with. Water and gas were available in King Street, and also in Seaton Place, which adjoined the ground on its southern border. Electric current would also be available. The site included sufficient ground for car parking purposes.

The Corporation of Aberdeen had undertaken to carry out, at their own expense, all work necessary to render the ground suitable for the Show, and all restoration work after the Show, other than such as was normally carried out by the Society. The Corporation would also, before the Show, put the road known as Seaton Place into a reasonable state of repair, so that it might be used as an access for stock and forage.

The Committee had no hesitation in recommending that the offer of the site by the Corporation of Aberdeen be accepted. In view of the fact that it had been secured by the Corporation, at considerable expense, specially for the purposes of the Show, the Committee suggested that the Directors record their appreciation of the Corporation's public-spirited action in the matter.

Revision of Bye-Laws.

The alterations in, and additions to, the Society's Bye-Laws, adopted at the Meeting of Directors on 3rd May, were formally notified to the Board, in terms of the Charter, and their adoption confirmed.

These alterations and additions, copies of which had been circulated to Members of the Board, appear in full on pages 525 and 526.

Damage by Trespass.

Colonel F. J. Carruthers of Dormont, Lockerbie, reported on the proceedings at a further Conference held on 6th June, and referred to the full report thereon which appeared in the newspapers of that date. It had been decided to approach the Secretary of State for Scotland, and ask him to receive a deputation in order to place the various points before him.

The Chairman expressed to Colonel Carruthers the thanks of the Directors for representing the Society at the various Conferences, and for his report.

Animal Diseases Research Association.

On the motion of Sir Ralph Anstruther, Bt., it was unanimously agreed to confirm the proposed grant of £200 for the current year to the Animal Diseases Research Association.

Glasgow Veterinary College.

On the motion of Sir Ralph Anstruther, Bt., it was unanimously agreed to confirm the proposed grant of £100 for the current year to the Glasgow Veterinary College.

Warble Fly Investigation.

Dr R. Stewart MacDougall, Consulting Entomologist, submitted a report on the progress of the Warble Fly Investigation. The work done this spring with Polvo had brought nearer what they aimed at—that at the end of the Investigation every county in Scotland should have done some experimental work on Warble. Experiments had been made in three counties, with an extract of pyrethrum, obtained through the Ministry of Agriculture, but so far these had shown that this material did not equal Polvo in efficacy or in cheapness. Another new point was that a strong belief existed amongst farmers whose land abutted on Deer Forests that the Warbles on their cattle were due to the attack of the Deer Warble Fly, a closely allied species of the Ox Warble Fly. He described attempts made to introduce the larvæ of the Deer Warble under the skin of calves, but so far the results of these experiments had been negative. It was hoped, however, that further information with regard to this point might yet be obtained.

The Chairman said they were all much indebted to Dr Stewart MacDougall for his report.

Finance.

A Minute of Meeting of Committee, dated 7th June, was submitted and approved.

The Minute dealt with the following matters:—

Highland Reel and Strathspey Society.—It was recommended that the grant of £30 be renewed for the current year.

Poisonous Substances in Feeding-Stuffs.—A letter was submitted from Dr J. F. Tocher, in which he stated that experiments on the effect of salt on Pigs and Poultry, and the effect of Cyanogenetic Glucosides and Castor Seed in rations to Live Stock, were being carried out at the Rowett Institute. The experiments with salt were approaching completion, and he hoped to submit a report at the November Meeting. With regard to the effects of Cyanogenetic Glucosides and of Castor Seed, the experiments, to be effective and conclusive, would require to be made on Cattle.

The Committee recommended that, before authority was given to incur expense on these experiments, Dr Tocher be requested to report on the course of the Investigation up to that time, and also to furnish a Statement of the expenses incurred up to date.

It was further recommended that this Report and Statement be remitted for consideration, with powers, to the following Sub-Committee: The Chairman, Treasurer, Honorary Secretary and Mr J. P. Ross-Taylor.

MEETING OF DIRECTORS HELD IN THE SHOWYARD, DUNDEE, 21st JUNE 1933.

Mr Alexander Murdoch, East Hallside, Cambuslang, Lanarkshire, in the Chair.

Present.—Vice-President—Lord Provost William H. Buist, O.B.E. *Ordinary Directors*—Mr James P. Brown; Mr George Buchanan; Mr Ian M. Campbell; Mr John E. B. Cowper; Mr James Durno; Captain Thomas Elliot; Mr Alexander Forbes; Mr W. P. Gilmour; Mr John Hewetson; Mr James Kilpatrick; Mr James M'Laren; Mr Robert Macmillan; Mr Robert Miller; Mr Gavin Ralston; Mr J. P. Ross-Taylor; Mr T. Mercer Sharp; Major R. W. Sharpe; Mr A. A. Hagart Speirs; Major S. Strang Steel; Captain John C. Stewart; Mr Phipps O. Turnbull; Mr Falconer L. Wallace; Mr T. G. Wilson; Mr James Wyllie. *Extraordinary Directors*—Mr Alexander Batchelor; Mr F. W. Christie; Mr Thomas Clark; Treasurer William Frain; Mr George Grant; Mr William C. Hunter; Mr Jamss R. Lumsden; Mr William Meiklem; Mr Alexander Murdoch; Mr Robert Park; Mr Andrew Pollock; Mr John W. Prentice; Lord Rowallan; Hon. Walter T. H. Scott, Master of Polwarth; Mr Thomas Templeton; Mr William Tod; Mr Archibald Whyte. *Treasurer*—Sir Ralph Anstruther of Balcaskie, Bt. *Honorary Secretary*—Colonel F. J. Carruthers of Dormont. *Auditor*—George James Gregor, C.A. *Consulting Engineer*—Professor R. Stanfield, A.R.S.M., &c.

Protests.

The Secretary reported that no protests had been lodged.

Precepts.

The Chairman was authorised to sign the precepts for the prizes awarded at the Dundee Show.

Authority was given to draw upon the Society's Ordinary Funds to meet any deficit on the Show Account, and also, if necessary, to obtain an overdraft from the Bank of a sum not exceeding £2000.

MEETING OF DIRECTORS, 1st NOVEMBER 1933.

Mr Alexander Murdoch, East Hallside, Cambuslang, Lanarkshire, in the Chair.

Present.—Ordinary Directors—**Mr George Buchanan; Mr Ian M. Campbell; Mr Alexander Clark; Mr Thomas Clark; Mr John E. B. Cowper; Mr James Durno; Captain Thomas Elliot; Mr W. P. Gilmour; Mr George Grant; Mr J. E. Kerr; Mr James Kilpatrick; Mr Robert Macmillan; Mr Alexander Munro; Dr T. G. Nasmyth; Mr John W. Prentice; Mr Gavin Ralston; Mr John M. Roger; Mr J. P. Ross-Taylor; Major S. Strang Steel; Captain John C. Stewart; Mr Phipps O. Turnbull; Mr James Wyllie.** ***Extraordinary Directors***—**Mr John**

D. Allan; Mr James P. Brown; Mr William Brown; Mr John M. Hannah; Lieut.-Colonel W. T. R. Houldsworth; Mr James R. Lumsden; Mr Donald Mackelvie; Mr James MacKillop; Mr Alexander Murdoch; Mr Robert Park; Mr T. Mercer Sharp; Major R. W. Sharpe; Mr John P. Sleigh; Mr A. A. Hagart Speirs; Mr Thomas Templeton; Mr Archibald Whyte. *Treasurer*—Sir Ralph Anstruther of Balcaskie, Bt. *Honorary Secretary*—Colonel F. J. Carruthers of Dormont. *Chemist*—J. F. Tocher, D.Sc., F.I.C. *Consulting Engineer*—Professor R. Stanfield, A.R.S.M., &c. *Consulting Entomologist*—R. Stewart MacDougall, M.A., D.Sc., LL.D.

The late Mr William J. H. Maxwell of Munches.

Before proceeding with the business of the Meeting, the Chairman referred, with very deep regret, to the death of Mr William J. H. Maxwell of Munches. Mr Maxwell, he said, had over sixty years' association with the Society, having become a Member in 1873. He served two terms of office as an Ordinary Director, six years as an Extraordinary Director, and was a Vice-President of the Society on four occasions.

Mr Maxwell was one of the best-known figures in public and agricultural affairs in the South-West of Scotland. He took a leading part in local administration, being for many years Convener of the county of Kirkcudbright, besides being Chairman of many other public bodies. In every important public movement affecting the welfare of the county he was identified as a leader and trusted adviser, and the great services he thus rendered earned for him universal admiration and esteem.

A Minute of regret and sympathy was submitted and adopted, the Members present upstanding, and the Secretary was instructed to forward a copy to Mrs Maxwell and the family of the deceased.

The late Mr Athole S. Hay of Marlefield.

The Chairman also referred, with very deep regret, to the death of another former Member of the Board—Mr Athole S. Hay of Marlefield. Mr Hay, he said, was a Member of the Society for over forty years, and served as an Ordinary Director for two terms of four years and as an Extraordinary Director on three occasions. While always taking an active interest in the affairs of the Society, he was perhaps most prominently identified with the Society's work when he acted as Convener of the Local Committee at the Kelso Show in 1926. There was no doubt that much of the success which the Show achieved was due to his personal interest and influence.

Mr Hay devoted much of his time and ability to the public service. He was keenly interested in everything affecting the welfare of Roxburghshire, and his unsparing efforts in that direction, combined with his charm of manner and genial personality, rendered him esteemed and honoured amongst all classes of the community.

A Minute of regret and sympathy was submitted and adopted, the Members present upstanding, and the Secretary was instructed to forward a copy to Mrs Hay and the family of the deceased.

Other Obituary References.

The Chairman also made sympathetic reference to the deaths of the following:—

TREASURER WILLIAM FRAIN, DUNDEE, who was a member of the Board during the past year, and who did much, not only to secure that the recent Show be held at Dundee, but also to promote its success.

EX-PROVOST ARTHUR MIDDLEMAS OF KELSO, who was an Extraordinary Director during the year of the Kelso Show, 1926, and who was untiring in his efforts to secure the success of the Show and to help the Society and its Officials in every possible direction.

PROVOST DONALD MACDONALD, INVERNESS, who, as an Extraordinary Director, took a deep interest in the work of preparation for the Show at Inverness in 1932, although unfortunately unable, through illness, to be present at the Show.

MR GAVIN HAMILTON, LESMAHAGOW.—A Member of the Society of over forty years' standing, and elected an Extraordinary Director for the coming year.

THE RIGHT HON. SIR MATTHEW W. MONTGOMERY, EX-LORD PROVOST OF GLASGOW, who acted as a Vice-President of the Society during the year of the Glasgow Show, 1925.

Chairman of the Board for 1933-34.

Mr Alexander Munro of Leanach, Inverness, moved that Mr Alexander Murdoch, East Hallside, Cambuslang, be re-elected Chairman of the Board for the ensuing year. He did not, he said, wish that any precedent should be created, but, as the Show next year was to be held in Glasgow, he thought it was very fitting that they should ask Mr Murdoch to continue in office for another year.

Mr George Grant, Glenfarclas, Blacksboat, seconded, and Mr Murdoch's re-election was unanimously agreed to.

Mr Alexander Murdoch, in accepting office, thanked the Directors for the honour they had again conferred upon him. It would be his duty, he said, to do everything possible to further the interests of the Society, and to endeavour, if at all possible, to make the Glasgow Show next year even more successful than the Show at Dundee this year.

Letters.

The following letters were submitted:—

Skinners' Association of Scotland.—Conveying grateful thanks for the work done in connection with the Discolouration of Wool. The letter stated that the Association recognised the difficulty in trying to eliminate dips which were injurious to wool, but they felt that the publicity given to the matter would be beneficial.

Animal Diseases Research Association.—Thanks for renewal of grant of £200 for the current year.

Highland Reel and Strathspey Society.—Thanks for renewal of grant of £30 for the current year.

Portrait of the late Mr Hugh Watson, Keillor.

A letter was read from Miss Amy Fergusson, Easter Dunfallandy, Pitlochry, inquiring whether the Society would care to accept an oil painting of her grandfather, the late Mr Hugh Watson, Keillor.

It was unanimously decided that the portrait be accepted, and that Miss Fergusson be thanked most cordially for offering it to the Society.

Dundee Show, 1933.

The Secretary reported that a Summary of the Accounts of the Dundee Show had that day been submitted to the Finance Committee. It was with great pleasure that he had to report that the Accounts showed a profit of £4835. Not only was the attendance at the Show a record, but the profit was also a record. The nearest approach to it was the 1925 Show at Glasgow, when there was a profit of £4226.

The Secretary further stated that the remarkable success of the Show, in spite of the depression in Agriculture and in all other industries, might be attributed to four main causes: (1) The fact that H.R.H. The Duke of York had honoured the Society by accepting the office of President for the year, and his presence, along with the Duchess, on two days at the Show, where they took a great interest in everything they saw, and were everywhere welcomed in a manner which provided conclusive evidence of their great popularity. (2) The remarkable enthusiasm of the people of Dundee and the County of Angus, ably headed by Lord Provost Buist and the Corporation of Dundee, which was expressed in the generous financial support extended to the Show, the presentation of Citizens' and other Cups, and the provision of an attractive and convenient site for the Show. (3) The Directors might take credit for the third point—viz., the widening of the interest of the Show by the inclusion, in addition to the usual features, of such additional attractions as a Flower Show, Sheep Dog Demonstration, Butter-making, Horse-Shoeing, Rural Industries, Poultry, Rabbits, Bees and Honey, &c., so that practically every member of the community could find something of interest in the Showyard. (4) A sympathetic Press. The Society was greatly indebted to the Press for the way in which it had fostered and maintained public interest in the Show.

Sir Ralph Anstruther of Balcaskie, Bt., Convener of the Finance Committee, said he was glad to see that the Directors expressed appreciation of that short Memorandum. He thought they might add that a considerable part of the success was due to the efforts of the Secretary, and that they should congratulate him on that success.

The Chairman said the result of the Dundee Show must be very gratifying to the Directors and Members. He suggested that a telegram be sent to His Royal Highness The Duke of York, informing him of the financial success of the Show, and also a similar telegram to the Lord Provost of Dundee. This was unanimously agreed to.

New Implements.—The Judges' Report on the award of the Society's Silver Medal for New Implements was submitted. Since the date of the Show, the Judges had inspected at work the Blackstone Mark No. 2 Potato Digger, entered by Messrs Blackstone & Co., Ltd., Stamford. They had reported that they did not see their way to recommend the award of the Silver Medal to this Implement, but if it were entered again next year they would be prepared to reconsider it for the award of the Medal.

Glasgow Show, 1934.

Judges.—The following were appointed a Selection Committee to draw up panels of Judges for consideration at next Meeting: Mr J. E. B. Cowper, Mr James Durno, Mr George Grant, Lieut.-Colonel W. T. R. Houldsworth, Mr J. E. Kerr, Mr James Kilpatrick, Mr James M'Laren, Mr Robert Macmillan, Mr Alexander Munro, Mr J. P. Ross-Taylor, Major Robert W. Sharpe, Mr Thomas Templeton, with the Chairman, Treasurer and Hon. Secretary, *ex officii.*

Forage Committee.—The following Committee was appointed to make arrangements for the supply of forage, and report to the Board: Mr John W. Prentice (*Convener*), Mr William Brown, Mr George Buchanan, Mr John E. B. Cowper, Mr James M'Laren, Mr Alexander Munro, Mr Robert Park, Mr T. Mercer Sharp, Mr John Speir, Mr Phipps O. Turnbull and Mr Archibald Whyte.

Show Contracts.—It was remitted to the following Special Committee, with powers, to arrange the contract for timber and other contracts in connection with the Showyard: Mr James Kilpatrick (*Convener*), Mr Alexander Clark, Mr James Durno, Mr George Grant, Mr James R. Lumsden, Mr James M'Laren, Mr R. Macmillan, Mr Alexander Munro, Mr Alexander Murdoch, Mr Gavin Ralston, Mr F. A. Rottenburg, Mr John P. Sleigh, Major S. Strang Steel and Professor Stanfield.

Hotel Accommodation and Catering in Showyard.—The Secretary reported that he had provisionally secured accommodation for Directors and Judges in the Central Station Hotel, Glasgow, which would be the headquarters of the Society during the period of the Show.

It was remitted to the Chairman of the Board, the Chairman of the Shows Committee, the Convener of the Local Committee, the Steward of Catering, and the Secretary, to make further necessary arrangements.

Forestry Exhibition.—It was agreed that space be granted to the Royal Scottish Forestry Society for an Exhibition of Timber, and also a grant of £40 towards the expenses of the Exhibition.

Special Prizes.—A large number of Special Prizes were accepted, and votes of thanks accorded to the donors.

Damage by Trespass.

Colonel F. J. Carruthers of Dormont, Lockerbie, reported on the proceedings at a Meeting between the Under-Secretary of State for Scotland, Mr A. N. Skelton, M.P., and a deputation representing the various bodies which had been deliberating on the subject. The deputation received a sympathetic hearing, although Mr Skelton could give no hope that legislation on the subject would be introduced in the immediate future.

On the motion of the Chairman, Colonel Carruthers was thanked for his services in connection with the matter.

London Quarantine Station.

A letter was read from the Red Poll Cattle Society with reference to the possibility of the London Quarantine Station being closed down at the end of the year, on account of the fact that the Empire Marketing Fund, out of which the annual deficits on the working of the Station had hitherto been met, had ceased to exist.

It was agreed that, as no official communication had reached the Society on the subject, no action be taken in the meantime.

Blackface Sheep Breeders' Association.

A letter was read from the Blackface Sheep Breeders' Association inviting the Society to appoint representatives to a proposed Conference on the following matters: damage to stock by motor traffic, Government grant for bracken cutting, damage to stock by straying dogs, and legislation as to deer.

It was agreed that the following gentlemen be appointed to represent the Society: Captain Thomas Elliot, Mr James M'Laren, Mr R. Macmillan and Mr Archibald Whyte.

Live Stock Marketing.

The Secretary reported the receipt, in July, of a communication from the Earl of Airlie inviting the Society to appoint two representatives to a composite Committee to draw up a Live Stock Marketing Scheme for Scotland. He also reported the receipt, at the same time, of a communication from the Scottish Chamber of Agriculture suggesting that a Joint Conference be held to consider the position regarding meat imports, and inviting the Society to send representatives to the proposed Conference. After communicating with the Chairman of Directors, the Secretary had replied to these communications that no ordinary Meeting of Directors would be held until November, and it would not be possible to convene a Special Meeting of Directors to deal with the matter.

After some discussion, it was decided, on the motion of the Chairman, to express sympathy with the movements, but, in the meantime, to take no action in the direction of appointing representatives.

Fertilisers and Feeding Stuffs Act, 1926.

A letter was submitted from the Department of Agriculture, forwarding copy letter from the Association of Public Analysts of Scotland, complaining that Local Authorities were not exercising their powers sufficiently in regard to the taking of samples of Fertilisers and Feeding-Stuffs for the purposes of the criminal provisions of the Act. The Department further stated that, before approaching the Local Authorities on the subject, they would be glad to be favoured with any observations which the Society might have to offer in the matter.

Sir Ralph Anstruther, Bt., pointed out that it was a matter for the Local Authorities, and suggested that a reply be sent to the letter to the effect that the Society had no observations to make.

This was unanimously agreed to.

Double Dipping Regulations.

A letter was submitted from the Ministry of Agriculture and Fisheries, enclosing, for the information of the Society, a copy of a circular letter which the Ministry had sent to all Local Authorities in Scotland and Northumberland concerning the movement of sheep into and out of Scotland and Northumberland. From this circular letter, the Department stated, it would be observed that the Regulations of Local Authorities in England, which required sheep moved from Scotland to be double dipped, had now been practically withdrawn.

Milk and Dairies (Scotland) Order, 1933.

The Secretary reported that he had received a letter, dated 11th July, from the Department of Health for Scotland, forwarding copy of a Draft Milk and Dairies (Scotland) Order, 1933, which it was proposed should supersede the Milk and Dairies (Scotland) Order, 1925. The Department stated they would be glad to be favoured with the observations of the Society on the provisions of the Order, not later than the end of July. He had accordingly submitted the Draft, in the first instance, to the Chairman of Directors, and thereafter to Colonel F. J. Carruthers and Mr T. G. Wilson. As a result, he wrote to the Department of Health, on 25th July, to the effect that there appeared to be nothing in the Order to which the Society could take exception.

The Meeting approved of the action which had been taken.

Finance.

A Minute of Meeting of Committee, dated 1st November, was submitted.

The Minute dealt, *inter alia*, with the following matters:—

Advertising Agents.—It was recommended that Messrs John Menzies & Co., Ltd., Edinburgh, be appointed Advertising Agents to the Society.

Y.M.C.A.—It was recommended that a grant of £35 be given to the Y.M.C.A. to meet the deficit on the working of the Y.M.C.A. Tent for Herdsmen and Attendants at Dundee Show.

Poisonous Substances in Feeding-Stuffs.—The Committee, on the report of a Sub-Committee, recommended that a sum not exceeding £50 be allocated to cover expenses of the Investigation being carried out by Dr Tocher.

150th Anniversary of Institution of Society.—The Secretary had reminded the Committee that the Society was instituted on 9th February 1784, so that 9th February 1934 would be the 150th anniversary of its foundation. There was also the fact that the Society's principal Royal Charter was granted in 1834, so that next year would be the 100th anniversary of the granting of that Charter. The Committee recommended that the Directors remit to a Special Committee to consider what steps, if any, should be taken to mark the occasion.

The Minute of the Finance Committee was approved, and the following Special Committee was appointed: Mr Alexander Murdoch (*Convener*), Sir Ralph Anstruther, Bt., Colonel F. J. Carruthers, Mr R. Macmillan, Major Robert W. Sharpe, Mr John E. B. Cowper and Dr T. G. Nasmyth.

MEETING OF DIRECTORS, 29TH NOVEMBER 1933.

Mr Alexander Murdoch, East Hallside, Cambuslang, Lanarkshire, in the Chair.

Present.—*Ordinary Directors*—Mr George Buchanan; Mr Ian M. Campbell; Mr Alexander Clark; Mr Thomas Clark; Mr John E. B. Cowper; Mr James Durno; Captain Thomas Elliot; Mr Alexander Forbes; Mr William Fraser; Mr George Grant; Mr John Hewetson; Mr J. E. Kerr; Mr James Kilpatrick; Mr James M'Laren; Mr Robert Macmillan; Mr Robert Miller; Mr Alexander Munro; Dr T. G. Nasmyth; Mr John W. Prentice; Mr Gavin Ralston; Mr John M. Roger; Mr J. P. Ross-Taylor; Lord Rowallan; The Hon. Walter T. H. Scott, Master of Polwarth; Major S. Strang Steel; Captain John C. Stewart; Mr Phipps O. Turnbull; Mr T. G. Wilson; Mr James Wyllie. *Extraordinary Directors*—Mr John D. Allan; Mr James P. Brown; Mr William Brown; Mr John M. Hannah; Lieut.-Colonel W. T. R. Houldsworth; Mr James R. Lumsden; Mr Donald Mackelvie; Mr James MacKillop; Mr Alexander Murdoch; Mr Robert Park; Mr F. A. Rottenburg; Major R. W. Sharpe; Mr John P. Sleigh; Mr John Speir; Mr A. A. Hagart Speirs; Mr Archibald Whyte. *Treasurer*—Sir Ralph Anstruther of Balcaskie, Bt. *Honorary Secretary*—Colonel F. J. Carruthers of Dormont. *Consulting Engineer*—Professor R. Stanfield, A.R.S.M., &c.

Letters.

The following letters were submitted:—

H.R.H. The Duke of York.—From Admiral Sir Basil V. Brooke, Comptroller, stating that H.R.H. The Duke of York desired to say how pleased he was to receive a telegram from the Directors informing him that the Dundee Show had created a record, both in attendance and profit. His Royal Highness, as President, congratulated all concerned on that excellent result of their labours.

Lord Provost W. H. Buist, Dundee.—Stating that His Lordship had received, with great gratification, the telegram informing him of the success of the Dundee Show.

Vacancies on Board.

On behalf of the Ordinary Directors in the Aberdeen Show Division, Mr James Durno moved that Colonel Robert W. Walker, Culter Lodge, Milltimber, Aberdeenshire, be nominated, at the General Meeting in January, as an Ordinary Director, to fill the vacancy caused by the resignation of Mr Falconer L. Wallace of Candacraig.

Mr William Fraser, Knockomie, Forres, seconded, and the nomination was unanimously agreed to.

On behalf of the Ordinary Directors in the Glasgow Show Division, Mr James Kilpatrick moved that Mr J. Harling Turner, Portland Estate Office, Kilmarnock, be nominated, at the General Meeting in January, as an Extraordinary Director, to fill the vacancy caused through the death of the late Mr Gavin Hamilton.

The nomination was unanimously agreed to.

Glasgow Show, 1934.

A Report of the Shows Committee of 31st October, which had been printed and circulated, was submitted and considered in detail.

Hunters.—It was agreed to add to the classification for Hunters a class for Hack of Hunter Type, born in or before 1930, 15.2 hands and under, in saddle, with prizes £8, £5 and £3.

Poultry and Rabbits.—The Sub-Committee appointed on 31st October recommended that the classes for Rabbits be the same as at Dundee, but that certain alterations, which were detailed, should be made in the classes for Poultry.

The Report of the Shows Committee was thereafter approved.

A further Minute of Meeting of Shows Committee, dated 29th November, was submitted and approved.

The Minute dealt with the following matters :—

Saddle Classes.—It was recommended that the Saddle Classes be as follows :—

Mare or Gelding, any age, over 13 hands and not exceeding 14.2 hands, in saddle, £5, £3, £2.

Mare or Gelding, any age, not exceeding 13 hands, in saddle, £5, £3, £2.

These ponies would require to attend at the Showyard on Wednesday only, and would be judged and paraded at times to be arranged by the Stewards. Entry fee 5s. for each class.

Eggs.—It was recommended that separate classes be provided for Brown Eggs and for Tinted Eggs.

Bacon Pig Competition.—On the motion of Mr John E. B. Cowper, it was decided to recommend that a Scottish Bacon Pig Competition be again held at the Show, on similar lines to that at Dumfries in 1930 and in previous years. This recommendation was made on the understanding that Dr Alexander Calder would be prepared to carry out the details of the Competition, as formerly.

Record Cows.—On the motion of Lord Rowallan, it was agreed to recommend that it be remitted to the Principal Stewards of Stock to consider a proposal to have a section at the Show, for exhibition only, for cows which, in their lifetime, had given a yield of 10,000 gallons of milk, or 4000 lbs. of butter fat.

Convener of Local Committee.—On the motion of the Chairman, seconded by Mr James Kilpatrick, it was unanimously agreed that Lieut.-Colonel W. T. R. Houldsworth of Kirkbride, Maybole, be appointed Convener of the Local Committee of Management.

Special Prizes.—A number of Special Prizes were accepted, and votes of thanks accorded to the donors.

Date of Annual Show.

The Chairman reported that the Directors, at a private Meeting the previous day, had received a deputation regarding the date of the Annual Show, comprising representatives of the Society of Border Leicester Sheep Breeders, the Cheviot Sheep Society, the Blackface Sheep Breeders' Association, the Suffolk Sheep Society, the Scottish Shorthorn Breeders' Association and the Clydesdale Horse Society. The deputation, he stated, put forward their case for changing the date of the Show from June to July. He had assured the deputation that their representations would be carefully considered by the Directors when fixing the date of the Aberdeen Show in 1935. The date of the Glasgow Show next year had already been fixed.

A letter was submitted from the Agricultural Engineers' Association, London, on behalf of Implement and Machinery Exhibitors at the Show, in which they strongly advocated the retention of the June date.

A discussion followed as to whether the terms of this letter should be given to the Press for publication. It was eventually decided, by a majority, that the letter be not published in the meantime.

£1000 *Premium for New Implement.*

An Interim Report by the Judges of Implements entered for the £1000 Premium, copies of which had been circulated to Members of the Board, was submitted.

In the Interim Report the Judges stated that, in the meantime, they were of the opinion that no one entry was of such outstanding novelty and general utility as to warrant the award of the whole sum offered. They, however, expressed the hope that, when they had completed their investigations, they might be able to report that some of the machines entered were worthy of recognition by the Society.

A Minute of Meeting of Implements Committee, dated 29th November, was submitted and approved.

The Minute recommended that, with respect to Implement No. 13, Bracken Cutting Machine, an opportunity of demonstrating the work of that machine be given at a suitable time next year.

With regard to Implement No. 17, Turnip Harvesting Machine, it was recommended that an opportunity of demonstrating that machine, provided it is complete and ready for work, be given at any time during the present Turnip Season.

150th Anniversary.

A Minute of Meeting of Special Committee, dated 23rd November, was submitted.

The Committee recommended that some steps should be taken to mark the occasion of the 150th Anniversary of the foundation of the Society, and they suggested the following:—

(1) That it would be appropriate, on such an occasion, to add to the Society's List of Honorary Members. By the Charter of 1834 the Society might elect twenty Honorary Members, and, at that date, there were only four on the list. Those were His Majesty The King, H.R.H. The Prince of Wales, Professor J. Cossar Ewart and Professor James Hendrick. A list of names of twelve suggested Honorary Members was submitted.

(2) That a Dinner be held on the actual anniversary date, 9th February, at which the new Honorary Members would be invited to be present, and for which all Members of the Society would be entitled to purchase tickets.

(3) That a Reading and Recreation Room for Herdsmen and Attendants on Live Stock be provided at the Annual Show. This building would serve as a permanent memento of the occasion.

After discussion, the various suggestions contained in the Minute of the Special Committee were approved, and it was remitted to that Committee, with powers, to carry out the details of the necessary arrangements.

Finance.

A Minute of Meeting of Committee, dated 29th November, was submitted and approved.

The Committee recommended:—

Royal Scottish Agricultural Benevolent Institution.—That a further grant of £500 be given to the Royal Scottish Agricultural Benevolent Institution.

Scottish Committee on Contagious Bovine Abortion.—That a grant of £1000 be given to the Committee towards the expenses of a proposed investigation by the Animal Diseases Research Association, in an attempt to produce a killed culture vaccine. The grant to be given in three equal payments, extending over a period of three years, and to be subject to the condition that the Committee in charge of the investigation was successful in raising the balance of the sum required to enable it to carry through the work on the scale proposed.

Scottish Agricultural Organisation Society.—That a grant of £100 be again given to the Scottish Agricultural Organisation Society for the year 1934.

Staff Salaries.—That the salary of Mr J. G. Yardley, Chief Clerk, be increased from £450 to £500 per annum, and the salary of Miss A. T. Maitland, Typist, be increased from £160 to £180 per annum, these increases to take effect as from 1st November 1933.

MEETING OF DIRECTORS, 10TH JANUARY 1934.

Mr ALEXANDER MURDOCH, East Hallside, Cambuslang, Lanarkshire, in the Chair.

Present.—Ordinary Directors—Mr George Buchanan; Mr Alexander Clark; Mr Thomas Clark; Mr John E. B. Cowper; Mr James Durno; Captain Thomas Elliot; Mr Alexander Forbes; Mr W. P. Gilmour; Mr George Grant; Mr J. E. Kerr; Mr James Kilpatrick; Mr James M'Laren; Mr Robert Miller; Dr T. G. Nasmyth; Mr John W. Prentice; Mr Gavin Ralston; Mr John M. Roger; Mr J. P. Ross-Taylor; The Hon. Walter T. H. Scott, Master of Polwarth; Major S. Strang Steel; Captain John C. Stewart; Mr T. G. Wilson. *Extraordinary Directors*—Mr John D. Allan; Mr William Brown; Bailie Donald C. Fletcher; Mr John M. Hannah; Colonel W. T. R. Houldsworth; Mr James R. Lumsden; Mr Donald Mackelvie; Mr James MacKillop; Mr Alexander Murdoch; Mr Robert Park; Mr F. A. Rottenburg; Mr T. Mercer Sharp; Major R. W. Sharpe; Mr Thomas Templeton; Mr Archibald Whyte. *Treasurer*—Sir Ralph Anstruther of Balcaskie, Bt. *Honorary Secretary*—Colonel F. J. Carruthers of Dormont. *Chemist*—J. F. Tocher, D.Sc., F.I.C. *Consulting Engineer*—Professor R. Stanfield, A.R.S.M., &c.

Letters.

The following letters were submitted:—

Glasgow Veterinary College.—Expressing thanks for Medals presented annually to successful students, and for the contribution to the College Funds.

Department of Agriculture for Scotland.—Intimating that the Department had decided that henceforth licences under the Improvement of Live Stock (Licensing of Bulls) Act, 1931, will not be granted in respect of bulls that are "rigs"—(*i.e.*, either monorchids or cryptorchids).

Ayrshire Cattle Herd-Book Society.—Requesting the Directors to adhere to the month of June as the fixed date for future Shows, as they considered the month of June to be much more suitable than July for Ayrshire Cattle Exhibitors.

Glasgow Show, 1934.

Stewards.—The principal Stewards of the various departments were appointed as follows: *Cattle*—Mr James Durno; *Horses*—Mr George Grant; *Sheep, Goats and Pigs*—Mr Robert Macmillan; *Poultry and Rabbits*—Mr James R. Lumsden; *Forage*—Mr John W. Prentice; *Grand Stands*—Major R. W. Sharpe; *Gates*—Mr Ian M. Campbell; *Catering, Honey, &c.*—Mr John E. B. Cowper; *Implements*—Mr J. P. Ross-Taylor; *Horticulture*—Mr A. A. Hagart Speirs.

Veterinary Inspector.—Professor William Robb, F.R.C.V.S., 16 Ward Street, Glasgow, was appointed Veterinary Inspector for the Show, on the usual conditions.

Conservative Club, Glasgow.—A letter was submitted from the Secretary of the Conservative Club, Glasgow, intimating that the General Committee of the Club had unanimously agreed to confer the privileges of Honorary Membership of the Club on the Directors of the Society during the period of the Show in Glasgow. The Secretary was instructed to convey to the Conservative Club, Glasgow, the cordial thanks of the Directors for this courtesy.

Timber Contract.—A Minute of Meeting of Show Contracts Committee, dated 10th January, was read and approved.

The Minute recommended the acceptance of a tender by Messrs George Gordon & Company, Aberdeen Sawmills, Aberdeen, for the hire of the timber for the Glasgow Show.

Horse-Shoeing Competition.—The following were appointed a Committee of Management of the Horse-Shoeing Competition: *Directors*—Mr John E. B. Cowper; Mr George Buchanan; Mr William Brown. *Local Blacksmiths*—Mr A. A. Linning, 406 Garscube Road, Glasgow, N.W.; Mr William M'Intyre, 9 Albert Drive, Glasgow, S. 2; Mr Hugh Begg, 1243 Shettleston Road, Glasgow.

It was recommended that the following be appointed to act as Judges of Horse-Shoeing, along with the Society's Veterinary Inspector: Mr Thomas Paul, Brandon Street, Motherwell; Mr William Johnston, Pitscottie, Cupar, Fife.

It was decided that the horses to be shod on this occasion should be town horses, but that the question of the type of shoe for the Shoe-making Competition should be left to the decision of the Horse-Shoeing Committee.

Rural Industries Section.—It was agreed that the following be invited to act as Judges of the Section: Miss Bruce, Highland Home Industries, 111A George Street, Edinburgh; Miss A. E. Paterson and Miss Jessie E. G. Grant, Jordanhill College, Glasgow, W. 3; Mrs E. Balfour Graham, Leven, Fife.

Edinburgh Gold Cup.—A letter was submitted from the Town Clerk of Edinburgh, dated 2nd December, in which it was stated that the Town Council were agreeable to the awarding of the Cup being left to the discretion of the Directors of the Society, on the understanding that, should the Corporation hereafter desire to make suggestions as to the award of the Cup, the Directors would give these suggestions due consideration. The Secretary stated that, on behalf of the Board of Directors, he had given the undertaking referred to. It was decided that this year the Cup be offered for the best animal in the Galloway Classes—" Extra Stock " eligible to compete.

Showground.—A Report on a visit of inspection to the Showground, on 21st December, by Mr Alexander Murdoch, Colonel W. T. R. Houldsworth, Mr James Kilpatrick, Bailie Donald C. Fletcher, Professor R. Stanfield and the Secretary, was submitted.

The Report stated that the Society's representatives were met on the ground by the following representatives of the Corporation: Councillor Thomas A. Kerr, Convener of the Parks Committee; Mr Besant, Director of Parks; and Mr Gordon, of the Town Clerk's Department. The ground was carefully gone over and examined in detail. The extent of the area to be enclosed was generally determined, as well as the location of the main sections and the position of the Parade Ground and principal buildings. The site of the Model Allotment was also fixed, and arrangements made for access thereto being given forthwith. The Director of Parks had agreed that all necessary filling in of bunkers should be carried out by the staff of the Parks Department. It had been found impossible to arrange for direct access from the Motor Enclosure to the Showyard on this occasion, as a right-of-way and a riding track intervened between the ground set aside for parking cars and the Showyard proper.

Highland Cattle.—On a request from the Highland Cattle Society, it was decided to amend the classification so that in each class the age should be reckoned as from 1st December in the preceding year instead of from the 1st of January.

Bacon Pig Competition.—A letter was submitted from Dr Alexander Calder, who had kindly undertaken to carry through the arrangements for the Bacon Pig Competition, suggesting that Mr T. Gilliland, Kilmarnock, be invited to act as Judge of the Competition, and this was agreed to. The later stages of the Competition would be carried out at the S.C.W.S. Bacon Curing Factory, Kilmarnock. Dr Calder also suggested the appointment of a small Committee to act in an advisory capacity in connection with the running of the Competition, and this was agreed to.

Parade of Corporation Horses.—Letters were submitted from Mr C. H. Macfarlane, Director of Cleansing, Glasgow, stating that the Cleansing Committee had decided to accept the invitation to hold its Annual Horse Parade within the Showyard on Thursday, 21st June. The Judges for the Parade would be Councillor William Smith and Mr James C. Caldwell, and Lord Provost Alexander B. Swan had consented to be present during the Parade and to present the prizes. It was agreed that the Director of Cleansing be thanked for the arrangements which he had been good enough to make.

Gloucestershire Old Spots Pig Society.—A letter was submitted from the Gloucestershire Old Spots Pig Society, requesting that the Silver Challenge Trophy presented by that Society for competition at the Show, and which had not been competed for for several years, should be forwarded to the Royal Agricultural Society of England. It was agreed that the request be complied with.

Special Prizes.—A number of Special Prizes were intimated, and votes of thanks accorded to the donors.

Special Grants.

On the motion of the Chairman, it was unanimously agreed to confirm the following Special Grants:—

Royal Scottish Agricultural Benevolent Institution, £500; Scottish Committee on Contagious Bovine Abortion, £1000, under conditions stated in Minute of Meeting of 29th November; Scottish Agricultural Organisation Society, £100 for year 1934.

Portrait of the late Mr Hugh Watson, Keillor.

The Secretary reported the receipt of the portrait of the late Mr Hugh Watson, Keillor. The frame required renovation, and the Secretary was instructed to have the necessary repairs carried out.

Show of 1936.

Major R. W. Sharpe of The Park, Earlston, moved the following resolution: "That provided a suitable site is available, and satisfactory financial and other arrangements can be made, the Society's Show of 1936 be held in the Border Show Division."

The motion was unanimously adopted.

Valuation of Sheep Stocks.

A letter was submitted from the Secretary of the Committee on Valuation of Sheep Stocks in Scotland, pointing out that the Committee had been appointed by the Secretary of State for Scotland with the following terms of reference: "To consider whether any alterations of the present methods of valuing Sheep Stocks in Scotland, on the termination of a tenancy, are desirable, and if so, what, and to report." The letter inquired if the Society desired to offer evidence before the Committee on matters covered by the terms of reference.

After discussion, it was decided, in view of the impossibility of submitting evidence which would express the views of the whole body of Members of the Society, that a reply be sent to the effect that the Society did not desire to offer evidence before the Committee.

Argyll Naval Fund.

A Minute of Meeting of Argyll Naval Fund Committee, dated 10th January, was read and approved.

The Minute stated that three vacancies had occurred in the list of beneficiaries, as follows: (1) Sub-Lieut. W. J. R. Campbell had received the grant for the full period of ten years. (2) Lieut. J. L. Hallowell had been promoted to the rank of Lieutenant. (3) Cadet D. V. Hugonin had now elected to enter the Mercantile Marine.

It was recommended that the following be appointed to two of the vacancies —viz., Donald Victor Maxwell Macleod and Norman Douglas Campbell.

MEETING OF DIRECTORS, 9TH FEBRUARY 1934.

Mr Alexander Murdoch, East Hallside, Cambuslang, Lanarkshire, in the Chair.

Present.—President—The Earl of Home, K.T. *Ordinary Directors*—Mr George Buchanan; Mr Ian M. Campbell; Mr Alexander Clark; Mr Thomas Clark; Mr John E. B. Cowper; Mr James Durno; Captain Thomas Elliot; Mr William Fraser; Mr W. P. Gilmour; Mr George Grant; Mr J. E. Kerr; Mr James Kilpatrick; Mr Robert Macmillan; Mr Robert Miller; Dr T. G. Nasmyth; Mr John W. Prentice; Mr J. P. Ross-Taylor; Lord Rowallan; Major S. Strang Steel; Captain John C. Stewart; Mr T. G. Wilson; Mr James Wyllie. *Extraordinary Directors*—Mr John D. Allan; Mr James P. Brown; Mr William Brown; Bailie Donald C. Fletcher; Colonel W. T. R. Houldsworth; Mr James R. Lumsden; Mr James MacKillop; Mr Alexander Murdoch; Mr Robert Park; Mr F. A. Rottenburg; Mr T. Mercer Sharp; Mr John Speir; Mr A. A. Hagart Speirs; Mr Thomas Templeton; Mr J. Harling Turner, C.B.E.; Mr Archibald Whyte. *Treasurer*—Sir Ralph Anstruther of Balcaskie, Bt. *Honorary Secretary*—Colonel F. J. Carruthers of Dormont. *Chemist*—J. F. Tocher, D.Sc., F.I.C. *Consulting Engineer*—Professor R. Stanfield, A.R.S.M., &c.

The late Mr Peter M'Intyre, Tighnablair.

Before proceeding with the business of the Meeting, the Chairman said it was with very deep regret that he had to refer to the death of a former Member of that Board—Mr Peter M'Intyre, Tighnablair. Mr M'Intyre, he said, joined the Society in 1900, was elected a Director in 1913, and served on the Board till 1919. He also served again as an Extraordinary Director in 1929, being the year of the Alloa

Show. Mr M'Intyre took a keen and practical interest in the affairs of the Society, being specially interested in Blackface Sheep and Highland Cattle, of both of which he was a breeder, and successful exhibitor. His services as a Judge were frequently in demand, and his opinion and judgment with regard to all questions concerning hill farming were constantly sought and highly valued. He devoted much time to the public service, and gave unsparingly of his time and ability to the cause of Agriculture and of Education. He was ever ready to assist in any matter affecting the welfare of his own district, or of the country at large, and, on this account, was highly esteemed throughout a wide area. His death was a loss to the Society, and to Agriculture generally, which they deeply deplored.

A Minute of regret and sympathy was adopted, the Members present upstanding, and the Secretary was instructed to forward a copy to Mrs M'Intyre and the family of the deceased.

Letters.

The following letters were submitted :—

Scottish Committee on Contagious Bovine Abortion.—Expressing thanks for the interest taken in the proposed Investigation, and for the promise of a grant, under certain conditions, of £1000.

Department of Agriculture for Scotland.—Referring to the 40th Annual Agricultural Show of the German Agricultural Society to be held at Erfurt from 29th May to 3rd June 1934.

London Council of the Centenary of the State of Victoria and the City of Melbourne.—With regard to the formation of a Scottish Delegation to visit Australia.

Glasgow Show, 1934.

Assistant Stewards.—Assistant Stewards of the various departments were appointed as follows : *Cattle*—Mr Alexander Munro ; *Horses*—Mr John P. Sleigh ; *Sheep, Goats and Pigs*—Mr James M'Laren ; *Forage*—Mr T. Mercer Sharp ; *Grand Stands*—The Master of Polwarth ; *Gates*—Mr James P. Brown ; *Implements*—Mr P. O. Turnbull.

Forage.—A Minute of Meeting of Forage Committee, dated 9th February, was read and approved.

The Minute stated that the Committee recommended the acceptance of the offer by the Forage Supply Co., Ltd., Springfield Mills, Leith, to supply forage for the Show.

Minute of Shows Committee.—A Minute of Meeting of Shows Committee, dated 9th February, was read and approved.

The Minute dealt with the following matters :—

Rule 32.—It was recommended that Rule 32, which provides that cows of all breeds (with certain exceptions) must have had a live or full-time calf within nine months previous to the Show, be amended so as to read that such cows must have had a live or full-time calf on or after 1st September of the year preceding the Show.

Sheep Dog Demonstration.—It was recommended that a Sheep Dog Demonstration be given on the Wednesday and Thursday evenings of the Show.

Highland and Western Island Ponies.—On a request by the Highland Pony Society, it was recommended that Class 90 be altered to read "Yeld Mare or Filly, born before 1932," instead of "Yeld Mare," as formerly.

Pavilion for Herdsmen.—An estimate had been submitted by Mr John Reid for constructing the proposed new front, with verandah, and packing-cases complete, for the pavilion for Herdsmen, which was to be erected to mark the 150th Anniversary of the foundation of the Society. The estimated figure given by Mr Reid was £45, and it was agreed to recommend that this be accepted, and that Mr Reid be instructed to proceed with the construction.

New Implements.—The following were appointed Judges of New Implements: Mr J. P. Ross-Taylor, Mungoswalls, Duns ; Mr P. O. Turnbull, Bowmont, Dunbar ; Mr John E. B. Cowper, Gogar House, Corstorphine.

Special Prizes.—A number of Special Prizes were intimated, and votes of thanks accorded to the donors.

150th Anniversary.

It was unanimously agreed that the following telegram be forwarded to His Majesty The King:—

"HIS MAJESTY THE KING,
SANDRINGHAM.

"The Directors and Members of the HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND, assembled to celebrate the 150th Anniversary of the foundation of the Society, beg respectfully to tender loyal Greetings to their Royal Patron and to express their assurances of continued loyalty and devotion to Your Majesty.

HOME, *President.*
ALEXANDER MURDOCH, *Chairman.*
JOHN STIRTON, *Secretary.*"

Show of 1936.

The following were appointed a Committee to visit and inspect available sites for the Show of 1936 in the Border Show Division: Mr James Durno, Captain Thomas Elliot, Mr George Grant, Mr Robert Macmillan, Mr John W. Prentice, Mr J. P. Ross-Taylor, Major R. W. Sharpe, Mr Thomas Templeton, with the Chairman, Treasurer and Honorary Secretary, *ex officii.*

Importation of Pedigree Animals Act, 1925.

The Secretary reported that a letter had been received from the Ministry of Agriculture and Fisheries, dated 30th January, with regard to the proposed importation of Corriedale Sheep from Australia. These sheep were registered in the Australian Corriedale Sheep-Breeders' Association Flock Book, and the views of the Society were requested as to the recognition of that Flock Book.

It was agreed that a reply be sent that the Society is of opinion that the Flock Book in question should be recognised for the purposes of the Importation of Pedigree Animals Act, 1925.

Eradication of Bracken.

On the motion of Mr Ian M. Campbell, Bal Blair, Invershin, it was agreed, as a matter of urgency, to suspend the Standing Orders in order to permit of consideration of the following Motion.

Mr Campbell then moved:—

> "That the Society submit to the Secretary of State for Scotland, and all Scottish Members of Parliament, a request to include under the Land Improvement Scheme a grant for the eradication of bracken, the contribution to be at least one half of the total cost."

The Motion was seconded by Dr T. G. Nasmyth, and unanimously agreed to.

Sheep Stock Valuations.

Mr Ian M. Campbell, speaking on behalf of Flockmasters, especially in the North of Scotland, protested against the decision arrived at at last Meeting of the Board not to offer evidence before the Committee on Valuation of Sheep Stocks in Scotland.

The Chairman, in reply, pointed out that the decision of the Board was arrived at after careful consideration and in view of the impossibility of submitting evidence which would express the views of the whole body of Members of the Society.

MEETING OF DIRECTORS, 7TH MARCH 1934.

Mr ALEXANDER MURDOCH, East Hallside, Cambuslang, Lanarkshire, in the Chair.

Present.—Ordinary Directors—Mr George Buchanan; Mr James Durno; Captain Thomas Elliot; Mr William Fraser; Mr W. P. Gilmour; Mr George Grant; Mr John Hewetson; Mr J. E. Kerr; Mr James M'Laren; Mr Robert Macmillan; Mr Robert Miller; Dr T. G. Nasmyth; Mr Gavin Ralston; Mr

John M. Roger; Mr J. P. Ross-Taylor; Major S. Strang Steel; Mr Phipps O. Turnbull; Mr T. G. Wilson. *Extraordinary Directors*—Bailie Donald C. Fletcher; Mr John M. Hannah; Mr James R. Lumsden; Mr James MacKillop; Mr Alexander Murdoch; Mr Robert Park; Mr F. A. Rottenburg; Major R. W. Sharpe; Mr John P. Sleigh; Mr Archiblad Whyte. *Treasurer*—Sir Ralph Anstruther of Balcaskie, Bt. *Honorary Secretary*—Colonel F. J. Carruthers of Dormont. *Consulting Engineer*—Professor R. Stanfield, A.R.S.M., &c.

Letters.

The following letters were submitted:—

Scottish Agricultural Organisation Society.—Thanks for renewal of grant of £100 for the current year.

Red Poll Cattle Society.—Forwarding copy of a Resolution passed by the Council of the Society with regard to the Eradication of Bovine Tuberculosis.

Glasgow Show, 1934.

Catering.—A Minute of Meeting of Catering Committee, dated 7th March, was submitted and approved.

The Minute recommended the appointment of the following four Licensed Caterers:—

Mr E. Pfeiffer, 82 Great King Street, Edinburgh.
The Royal Athenæum, Ltd., Union Street, Aberdeen.
Messrs M. Mitchell & Co., Ltd., 2 Gloucester Place, Edinburgh.
The Caledonian Hotel, Ltd., Union Terrace, Aberdeen.

The British Women's Temperance Association would, as usual, have an unlicensed Refreshment Stand.

The appointment of a caterer for the Society's unlicensed Refreshment Stand was deferred until next Meeting.

The condition that only home-fed meat shall be supplied in the Catering Stands was again imposed on all the caterers.

Showyard Arrangements.—A Minute of Meeting of Shows Committee, dated 7th March (embodying Minutes of Meetings of a Sub-Committee, dated 10th January and 6th March), was submitted and approved.

The Minutes dealt with the following matters:—

Boxes for Stallions.—It was recommended that the boxes for Aged Stallions and three-year-old Colts and Aged Geldings be increased to 10 ft. by 12 ft.

Record Cows.—In connection with the remit from the Board, with regard to the suggestion made by Lord Rowallan that a section be provided at the Show, for exhibition only, for Cows which, in their lifetime, had given a yield of 10,000 gallons of milk, or 4000 lbs. of butter fat, the Committee reported that they could not see their way to recommend the adoption of the proposal.

Sheep Pens.—On a report by Mr John Reid, that the cost of storing, transport and handling of the Society's iron sheep hurdles rendered the cost of erecting sheep pens with these equal to the cost of pens constructed entirely of timber, it was decided to recommend that the iron hurdles be scrapped, and that Mr Reid be instructed to dispose of them to the best advantage.

Attendants' Boxes.—It was recommended that double canvas covering be provided for Attendants' Boxes in the Cattle, Sheep and Pig Sections, and that the canvas divisions between the boxes in the Sheep Section be retained.

Herdsmen's Pavilion.—Acceptance was recommended of an offer by the Scottish National Council of the Y.M.C.A. to hire 300 chairs, 20 tables and one counter for the duration of the Show.

It was further recommended that it be left to the Y.M.C.A., for the current year at least, to conduct a Service for Herdsmen on the Sunday evening in the Herdsmen's Pavilion.

Horse Boxes.—It was recommended that the boarded front of the shedding containing the horse boxes be dispensed with, thus leaving the front of the boxes open to the Showyard with simply the protection of the projecting roof.

Motor-car Enclosure.—It was recommended that the Motor-car Enclosure be placed in the hands of the Royal Scottish Automobile Club, and that it be suggested to the Club that the charge for motor-cars be at the rate of 2s. 6d. per day, with a reduced charge of 1s. or 1s. 6d. after 4.30 P.M. on the late evenings.

150th Anniversary.

A Report on the Dinner held on 9th February to celebrate the 150th Anniversary of the foundation of the Society was submitted by the Secretary.

The Report stated that, at the Dinner, the following telegram was received from His Majesty The King, and read by the President at the outset of the proceedings:—

> "EARL OF HOME,
> HIGHLAND AGRICULTURAL SOCIETY,
> EDINBURGH.
>
> "Please convey to the Directors and Members of the Highland and Agricultural Society assembled to celebrate the 150th Anniversary of the foundation of the Society my sincere thanks for their kind message of loyalty and devotion. As Patron I send my best wishes for the future welfare of the Society. GEORGE R. I."

Finance.

A Minute of Meeting of Committee, dated 7th March, was submitted and approved.

The Minute dealt with the following matters:—

Royal Scottish Agricultural Benevolent Institution.—It was recommended that, in response to an invitation from the Institution, the Chairman of Directors be nominated to serve as an *ex officio* Director of that body.

Grants to Outside Bodies.—It was recommended that a remit be made to the following Sub-Committee to consider the financial position of the Society with respect to grants to other bodies, and to report as to what was considered desirable in the direction of estimating beforehand the amount available for grants to such bodies: Sir Ralph Anstruther, Bt.; Mr Alexander Murdoch; Colonel F. J. Carruthers; Mr William C. Hunter; Mr J. P. Ross-Taylor; Mr George James Gregor.

Eradication of Bracken.

The Secretary intimated the receipt of letters from various Scottish Members of Parliament, acknowledging the Resolution regarding the Eradication of Bracken passed at last Meeting of the Board. Amongst these were letters from the Earl of Dalkeith, in which he asked to be supplied with particulars in support of the application for a Government grant. The Secretary read the letters which he had written in reply, the terms of which the Meeting approved.

It was decided that the second letter from the Earl of Dalkeith should be submitted to Mr Ian M. Campbell for his observations before any further reply was sent.

Resignation of Consulting Entomologist.

A letter was read from Dr R. Stewart MacDougall tendering his resignation as Consulting Entomologist to the Society.

It was decided that the resignation be accepted, with regret, and it was remitted to the Finance Committee to consider the appointment of a successor, and to suggest steps which should be taken to mark the Society's appreciation of Dr Stewart MacDougall's valuable services to, and long connection with, the Society.

PROCEEDINGS AT GENERAL MEETINGS.

GENERAL MEETING, 7TH JUNE 1933.

Sir RALPH ANSTRUTHER of Balcaskie, Bart., Treasurer of the Society, in the Chair.

New Members.

One hundred and sixty-eight candidates were balloted for and admitted members of the Society.

Election of Office-Bearers.

The following noblemen and gentlemen were elected office-bearers of the Society for the year 1933-34:—

President.—The Earl of Home, K.T., Douglas Castle, Lanarkshire.

Vice-Presidents.—The Duke of Montrose, C.B., C.V.O., Buchanan Castle, Drymen; Maclachlan of Maclachlan, Castle Lachlan, Strathlachlan; Sir Hugh Shaw-Stewart, Bart., K.C.B., Ardgowan, Inverkip; The Right Hon. Alexander B. Swan, Lord Provost of the City of Glasgow, City Chambers, Glasgow.

Ordinary Directors, 1930.—Mr James Kilpatrick, Craigie Mains, Kilmarnock; Mr J. P. Ross-Taylor, Mungoswalls, Duns; Mr Robert Miller, Ferrygate, North Berwick; Mr J. E. Kerr of Harviestoun, Dollar; Mr Robert Macmillan of Holm of Dalquhairn, Woodlea, Moniaive; Mr Charley Tinker, Kilmartin, Inverness; Mr John M. Roger, Balgove, St Andrews.

1931.—Mr Alexander Forbes, Rettie, Banff; Major S. Strang Steel of Philiphaugh, Selkirk; Mr John E. B. Cowper, Gogar House, Corstorphine, Midlothian; Mr James M'Laren, Cornton, Bridge of Allan; Mr John Hewetson, Baltersan, Newton-Stewart; Mr Ian M. Campbell, Bal Blair, Invershin; Mr Alexander Clark, Strathore House, Thornton; Captain John C. Stewart of Murdostoun, Newmains.

1932.—Captain Thomas Elliot, Thirlestane, Lauder; Mr Phipps O. Turnbull, Bowmont, Dunbar; Mr T. G. Wilson, Carbeth Home Farm, Balfron Station; Mr W. P. Gilmour, Balmangan, Kirkcudbright; Mr Alexander Munro of Leanach, Culloden Moor, Inverness; Mr Gavin Ralston, Glamis House, Glamis; Mr George Buchanan, Hunterhill Farm, Paisley; Mr James Durno, Crichie, Inverurie.

1933.—Dr T. G. Nasmyth, Canaan Lodge, 43 Canaan Lane, Edinburgh; Mr John W. Prentice, Craigrie Farm, Clackmannan; Mr James Wyllie, Tinwald Downs, Dumfries; Mr William Fraser, Knockomie, Forres; Mr Thomas Clark, Muirtons, Perth; Lord Rowallan, Rowallan, Kilmarnock; Mr George Grant, Glenfarclas, Blacksboat; The Hon. Walter T. H. Scott, Master of Polwarth, Harden, Hawick.

Extraordinary Directors.—Mr Alexander Murdoch, East Hallside, Cambuslang; Mr Robert Park, Brunstane, Portobello; Mr James R. Lumsden of Arden, Dumbartonshire; Mr Thomas Templeton, Sandyknowe, Kelso; Mr Archibald Whyte, Spott, Kirriemuir; Major Robert W. Sharpe of The Park, Earlston; Mr John P. Sleigh of St John's Wells, Fyvie; Mr T. Mercer Sharp, Bardrill, Blackford; Mr James P. Brown, Dipple, Fochabers; Mr John D. Allan, Culthill Implement Works, Murthly.

Show District.—Mr William Brown, Craigton, Bishopton; Bailie Donald C. Fletcher, 5 Kirklee Gardens, Bellshaugh Road, Glasgow; Mr Gavin Hamilton, Auldtoun, Lesmahagow; Mr John M. Hannah, Girvan Mains, Girvan; Lieut.-Colonel W. T. R. Houldsworth of Kirkbride, Maybole; Mr Donald Mackelvie, Newlanark, Lamlash; Mr James MacKillop, Islay Estate Office, Bridgend, Islay; Mr F. A. Rottenburg, 55 West Regent Street, Glasgow; Mr John Speir, Newton Farm, Hallside, Glasgow; Mr A. A. Hagart Speirs of Elderslie, Houston House, Houston.

Treasurer.—Sir Ralph Anstruther of Balcaskie, Bart., Pittenweem.

Honorary Secretary.—Colonel F. J. Carruthers of Dormont, Lockerbie.

Special Grants.

Mr James R. Lumsden of Arden, Dumbartonshire, moved approval of the following Special Grants which were recommended by the Board of Directors:—

(1) £200, for the current year, to the Animal Diseases Research Association.
(2) £100, for the current year, to the Glasgow Veterinary College.
(3) £30, for the current year, to the Highland Reel and Strathspey Society.

Mr Alexander Munro of Leanach, Inverness, seconded, and the grants were approved.

Dundee Show, 1933.

Mr Archibald Whyte, Spott, Kirriemuir, Convener of the Shows Committee, reported that the arrangements for the forthcoming Show at Dundee, on 20th June and three following days, were well advanced. As previously reported, the town of Dundee had provided an excellent site at the Station Park. This park lay immediately to the west of the northern end of the Tay Bridge, between the Perth and Dundee railway and the river. The ground was level, and over the greater part of the surface there was a good growth of grass, which had now been mown and presented an attractive appearance. Besides providing the site and a free supply of water, the Corporation of Dundee had generously contributed a handsome donation of £1000 to the Show Funds, and the Lord Provost, Members of Council and Officials, were enthusiastically co-operating with the Society in its efforts to promote the success of the Show.

An excellent entry of live-stock had been obtained. Cattle entries numbered about 100 more than at Inverness last year, and 50 more than at Perth in 1924. Horses were more numerous than at Inverness, while Sheep reached practically the same figure as at Inverness, but were better than at the last Show in Perth. It should be borne in mind that the Inverness figures were increased by the inclusion of additional classes for North Country Cheviots, which accounted for 20 per cent of the total entry. Pigs, Poultry and Rural Industries all showed increases from last year. The Horse-Shoeing and Live-Stock Judging Competitions had attracted large entries. The Buttermaking Competition had received such a large entry that it would be necessary to continue it throughout the four days of the Show. The Horticultural Section would be on a larger scale than at any previous Show, and was sure to be a centre of very great interest.

Implements, Machinery and General Exhibits had also secured a good entry, the total lineal feet of stand frontage being about 9200 feet, or almost 1000 feet more than at the last Show at Perth.

Their Royal Highnesses The Duke and Duchess of York would visit the Show on Thursday and Friday, the 22nd and 23rd inst. His Royal Highness The Duke of York, as President for the year, would preside at the Meeting of Members in the Showyard at 12 noon on Thursday, the 22nd, and would present the Champion Medals to the winners in the Horse Classes in the Parade Ring on Thursday afternoon, and to the winners in the Cattle Classes on the Friday afternoon. Visits of inspection would be paid by Their Royal Highnesses to various exhibits in the Showyard in the course of the two days. It was confidently expected that the people of Scotland would show their appreciation of this Royal visit by attending the Show in large numbers, and thus offering Their Royal Highnesses a royal welcome.

The prospects for the success of the Show were most encouraging, and, given favourable weather, there was every reason to hope that it would be an unqualified success.

Glasgow Show, 1934.

Mr James Kilpatrick, Craigie Mains, Kilmarnock, Vice-Convener of the Shows Committee, reported that, as previously intimated, the Show of 1934 would be held at Glasgow. The Corporation of Glasgow had placed at the disposal of the Society an excellent site at Bellahouston Park, where the Show was held in 1925. In addition to the site, the Corporation had generously decided to contribute a sum of 500 guineas to the Show Funds. The President and Office-Bearers for the year of the Show had just been elected, and active preparations for the Show would commence immediately after the conclusion of the Show at Dundee.

Aberdeen Show, 1935.

Mr James Durno, Crichie, Inverurie, reported that the Directors had that day accepted an invitation from the Corporation of Aberdeen to hold the Show of 1935 at Aberdeen, on a site kindly offered by the Corporation on the lands of Seaton. That site lay to the east of King Street, near the Bridge of Don. It was ample in extent, extended to over 60 acres, and was readily accessible from the city, being only one and a half miles from the centre of the town. In addition to the site, a free supply of water would be provided, and both gas and electric current would be available on the Showground. The Corporation had also generously agreed to carry out all work within the ground and in the accesses thereto which might be found necessary to render them suitable for the purpose, and to restore the ground at the termination of the Show.

Revision of Bye-Laws.

Mr Alexander Murdoch, East Hallside, Cambuslang, Chairman of Directors, moved approval of the following alterations in and additions to the Society's Bye-Laws, as recommended by the Board of Directors at a meeting held on 31st May, and confirmed at a meeting held that day:—

Bye-Law 2.—That the words " Grain, Seed and Manure Merchants, Agricultural Auctioneers, Cattle Dealers," be introduced after the words " Agricultural Implement Makers " in line 5.

The following new Bye-Law to follow Bye-Law 2 :—

" 3. Any ordinary Member of the Society who has paid an annual subscription for a period of not less than forty years, and who has intimated to the Society the desire to be relieved of further annual payments, shall be admitted by the Board of Directors as a Life Member without further payment."

The following new Bye-Laws to follow Bye-Law 4 :—

" New Members shall not be entitled to vote on any question which may arise at the Meeting at which such new Members are elected." (*If adopted, this will become Bye-Law* 6.)

" Twenty Members personally present shall be a quorum for a General Meeting, and no business shall be transacted at any General Meeting unless the quorum requisite be present at the commencement of the business. If within half an hour from the time appointed for the Meeting, a quorum is not present, the Meeting, if an occasional General Meeting convened by the Directors, shall be dissolved, but in any other case it shall stand adjourned to such day, time and place as the Directors may decide, and if at such adjourned Meeting a quorum is not present, any ten Members who are personally present shall be a quorum and may transact the business for which the Meeting was called." (*If adopted, this will become Bye-Law* 7.)

Bye-Law 11.—That the words " the President, a Vice-President, the Treasurer, Honorary Secretary, or " be introduced between the words "retirement of " and " a Director " in line 2 ; that the words " President, Vice-President, Treasurer, Honorary Secretary, or " be introduced between the words " and the " and " Director " in line 4 ; that the word " retiring " be deleted in line 5, and that the words " official or " be introduced before the words " Director whose vacancy he fills " occurring in the same line. (*If adopted, this will become Bye-Law* 14.)

Bye-Law 16.—*That this Bye-Law be deleted, and the following new Bye-Laws be substituted therefor* :—

" 19. At General Meetings of the Society no motion shall be submitted or entertained for immediate decision, unless notice thereof has been given two weeks previously to the Board of Directors, without prejudice, however, to the competency of a motion of which due notice has not been given being remitted to the Directors for consideration and thereafter being disposed of at a future General Meeting."

"20. All Notices of motions shall be dated as received, and shall be entered by the Secretary upon the Agenda Paper containing a note of the business to be considered at such General Meetings."

"21. Where an amendment is made on a motion, the vote shall be taken between the motion and the amendment. When there is more than one amendment, the amendment last proposed shall be put against that immediately preceding, and the one which is carried shall be put against the next preceding, and so on until there remains only one amendment, between which and the original motion the vote shall be taken. If an amendment be carried, the motion amended shall take the place of the original motion, and shall become the question upon which any further amendment may be moved."

"22. Every question submitted to a General Meeting shall be decided in the first instance by a show of hands, or afterwards by a poll if duly demanded, and in the case of an equality of votes the Chairman shall, both on the show of hands and at the poll, have a casting as well as a deliberative vote."

"23. At any General Meeting, unless a poll is demanded immediately on the declaration of the result of the show of hands as provided for in the following Bye-Law, a declaration by the Chairman that a resolution has been carried or lost, and an entry to that effect in the book of proceedings of the Society, shall be conclusive evidence of the fact without proof of the number of the votes recorded in favour of or against such resolution."

"24. The Chairman shall be entitled to order a poll, and he shall do so if a poll is demanded by either at least five Directors or ten Members, and the poll shall be taken at such time and place as the Chairman of the Meeting directs, and either at the Meeting, or after an interval, or adjournment, or otherwise. If the Chairman directs that the poll is to be taken at the Meeting, the voting papers shall be in such form as he may determine, and one voting paper shall be handed to each Member present. If the Chairman directs that the poll shall be taken on a future day to be fixed by him, the voting papers shall also be in the form determined by him and shall be sent by post to every Member of the Society. The voting papers must be returned so as to be in the hands of the Secretary at least forty-eight hours before the date fixed for the poll. The result of the poll shall be deemed to be the Resolution of the Meeting at which the poll was demanded."

"25. The demand of a poll shall not prevent the continuance of a Meeting for the transaction of any business other than the question on which a poll has been demanded."

"26. The Board of Directors shall have power to determine from time to time whether any and, if so, what regulations in addition to those herein contained shall be prescribed as to admission to and voting at Meetings of the Society."

On the motion being put to the Meeting by the Chairman, the suggested alterations and additions were unanimously approved.

Agricultural Education.

Colonel F. J. Carruthers of Dormont, Convenor of the Education Committee, submitted the following report on the Examination held at Leeds from 19th to 26th April for the National Diploma in Agriculture. 138 candidates presented themselves for examination; 29 candidates were from Scotland. As a result of the Examination, 50 Diplomas were awarded, 1 with Honours. Of the 138 candidates, 5 appeared for all the subjects, but none of these passed. 73 had passed certain subjects previously and were completing the Examination this year, and of these 50 obtained the Diploma. The remaining 60 presented themselves for groups of three, four, or five subjects, and of these 32 passed in the subjects for which they appeared and were entitled to appear for the remaining subjects in 1934 or 1935.

Science.

(1) *Report by Entomologist.*

Dr R. Stewart MacDougall, Consulting Entomologist, submitted a report on work done in his department. A full account thereof appears on pp. 170 to 201 of this volume.

Mr Robert Cross, Edinburgh, asked for the latest information with regard to methods of control of the Turnip-fly beetle.

Dr Stewart MacDougall replied, and undertook to furnish Mr Cross with information regarding the most recent experiments on the subject.

(2) *Report by Chemist.*

Dr J. F. Tocher, Consulting Chemist to the Society, submitted a report on the work done in that department during the past half-year. The substance of Dr Tocher's report appears on pp. 285 to 291 of this volume.

Vote of Thanks to Chairman.

On the motion of Mr A. A. Hagart Speirs of Elderslie, a cordial vote of thanks was accorded to Sir Ralph Anstruther, Bart., for presiding.

GENERAL MEETING OF MEMBERS HELD IN THE SHOWYARD, DUNDEE, 22ND JUNE 1933.

HIS ROYAL HIGHNESS THE DUKE OF YORK, K.G., K.T., President of the Society, in the Chair.

His Royal Highness the Duke of York, in opening the proceedings, said:—

MY LORDS, LADIES AND GENTLEMEN,—The Duchess of York and I are very glad to have this opportunity of visiting the 102nd Show of your Society, and, speaking for myself, I wish to say how very much I appreciate the honour you have done me in making me your President, especially this year, when we are passing through a very critical time in the history of agriculture. Never before has so much time and thought been given by people to the industry, or have farmers tried so hard to organise it. But owing to world-wide depression, the consumption of agricultural produce is below normal. At the same time, through the discoveries of science, we are enabled to meet almost any demand for food. It follows that while all efforts are being made by delegates from all nations to seek a remedy for world depression, we must find some means of adjusting the distribution of supplies. Active efforts to solve this problem are being made along the lines of orderly marketing and organisation. As we all know, the agricultural products of Scotland are famed for their excellence in every part of the globe, and rightly so, when we judge from the examples which have been gathered together at this Show.

In these days it is not enough to produce the best. The farmer, with the aid of his organisation, must study the market, and see that his produce reaches the consumer at the proper time and in the form and amount that he wants. He must also seek ways of proving to the consumer that Scottish produce is good value for money.

That is one of the reasons why the Highland Show is of such service to the agriculturist. It is not only an exhibition, it is an education. I know that throughout its career the Society has taken a special interest in research in conjunction with the Royal Agricultural Society of England. It has held examinations and gives diplomas, and also awards long-service certificates and medals, and, last but not least, it gives grants to local societies for premiums to the amount of about £1000 a year. You have every reason to be proud of your history and tradition, and of the invaluable assistance which you have rendered to the agriculture of this country.

It is very encouraging to see how Scottish farmers are responding to the new situation, and are co-operating in trying to overcome the present difficulties. They are to be warmly congratulated on the manner in which they are making use of the opportunities provided by the Agricultural Marketing Act and other schemes aimed at the restoration of the prosperity of the industry. I know how very hard times have been for the farmer within the last few years, and, having the pleasure of knowing some of the Earl of Strathmore's tenant-farmers on the Glamis estate, I have been able to gather at first hand a little of the trials and tribulations, and also the triumphs, of a farmer's life.

And now, ladies and gentlemen, on behalf of the Duchess of York and myself, I offer our warmest congratulations to the Directors of the Highland and Agricultural Society on the success of this splendid exhibition, and we hope that your work will continue to be blessed with prosperity and good fortune. Ladies and gentlemen, it might interest you to know that the attendance at 11 A.M. was 19,627. I will now call upon Mr Alexander Murdoch to move a vote of thanks to the city of Dundee.

Mr Alexander Murdoch, East Hallside, Lanarkshire, Chairman of Directors, said the vote of thanks he had to move was in the following terms: "That a cordial vote of thanks be accorded to the Lord Provost, Magistrates and Council of the city of Dundee for the excellent site provided for the Show, for their generous donation to the Show Fund, and for their hearty co-operation and assistance in all matters tending to promote the success of the Show." He knew that motion would be endorsed by the Meeting with all cordiality. It was forty-three years since the Society last visited Dundee, and on that occasion the city, unfortunately, gave the Society a site that did not satisfy the Directors and the public. On this occasion they had made amends, and given them probably one of the finest sites the Highland Society had ever had. Not only that, but the Lord Provost, Magistrates and all the officials connected with the city had taken the greatest interest in this visit, and they were all determined to make the Show a great success. Along with some of the officials of the Society, he visited Dundee on several occasions in connection with the arrangements. On all occasions the Lord Provost was at the station to meet them, and informed him that if there was anything he could do to assist them he was going to do it, because he was determined Dundee would make amends for the past, and make sure that when the Show came to the Perth Show District again it would come to the city of Dundee.

He did not think it was necessary for him to say anything further in commending the motion to the Meeting, but he would like to refer to the four handsome cups which had been presented to the Society this year. There was one from the Angus Agricultural Association, two were from the Dundee citizens and one from Sir Ian Hamilton. On behalf of the Directors of the Society, he tendered to the donors most grateful thanks. Their Royal President had mentioned that the Society contributed £1000. Might he make it very clear that that £1000 represented grants to local societies by the Highland Society, and that, in addition to that, this Society gave annually between £4000 and £5000 in money prizes, as well as many cups and other trophies.

Mr Archibald Whyte, Spott, Kirriemuir, Convener of the Shows Committee, said he had very great pleasure in seconding Mr Murdoch's motion. He did not think Mr Murdoch had said one word too much in praise of the Lord Provost, Magistrates and Councillors of the city of Dundee, and of the officials working with them. They had really been a splendid body altogether. To show the kindness they had received from the city of Dundee, he rather thought before they struck camp the bandmaster of the K.O.S.B. should be asked to play "Will ye no' come back again" and "Bonnie Dundee."

The Duke of York put the motion to the Meeting, and it was unanimously carried.

Lord Provost W. H. Buist, in acknowledging, said he did not think it was necessary to have said one word regarding the services rendered by the city of Dundee, because they in Dundee were only doing what they could to make amends for the sins of the past, and to secure that what the Chairman of Directors had stated would come to pass—namely, that Dundee itself would be placed on the regular rota of the Highland and Agricultural Society's Shows. He was glad, however, that the motion paid particular attention to the services rendered by his colleagues and his officials. So far as his own part was concerned it had been very slight, but it had been really pleasant. Of the many duties that fell upon a Lord Provost he did not think any could have been more pleasant than to have been elected a Vice-President of the Highland and Agricultural Society, and he would always esteem it as one of the proudest honours that had fallen upon him. In connection with that might he be permitted to say that all his colleagues and the officials had done their best to make the show a success. When Treasurer Frain brought that matter before them, there were a number who thought it was a futile thing to do, but he was glad that the Council had unanimously approved of the proposal, and that today they found, as the Chairman had said, that they had one of the finest sites possible for the Show. He was quite sure that the Dundee Show would be a red-letter one, and not only on account of the site but very largely because of the fact that Their Royal Highnesses had graced it that day and that they were to have the privilege of their presence again the next day. The Directors of the Society were a body of men actively interested not only in the work of the Society but in the welfare of Scotland, and seeking to do all they could for the world of agriculture. In addition to the Directors, he must pay tribute to the very efficient services rendered by Mr Stirton, the Secretary, and those under him. It was hardly possible to conceive how easily this Show had risen out of nothing, and that was very largely due to the industry and efficiency of the Secretary and his staff, and he wished there to pay a tribute to that efficiency. He thanked the Meeting for their hearty vote of thanks, and he hoped they would all come back again.

Colonel F. J. Carruthers of Dormont, Lockerbie, moved that a vote of thanks be accorded to the Duke of Atholl, Convener, and members of the Local Committee of Management for all the work they had undertaken and successfully carried out in connection with the Show. The Convener this year had always been a strong supporter of the Society. Until recent years he was a regular and successful exhibitor, and they now missed his entries in the Highland pony and Highland cattle sections because they were always of outstanding merit, and the Shows were the poorer for their absence. This year the Duke of Atholl had been kind enough to accept office as Convener of the Local Committee, and he thought they ought to appreciate that kindness all the more when they considered that this was only the second occasion since the Show was in Dundee forty-three years ago in which the Show had been held outside his own county of Perth. As to the members of the Committee, he would like to say they were really the backbone of the first day of the Show. It was their duty to attend on the judges and to bring forward the stock and to see that there was no delay in carrying through the programme. Theirs was hard work, especially in some of the heavier classes, and many of them, especially those who were breeders and exhibitors of stock, were sacrificing their own interests, because it was one of the rules of the Society that no man could be appointed an attending member on a class of stock in which he was personally interested. That meant that those of them who were exhibitors of stock had to go away to another class of stock and miss seeing their own animals placed.

Mr Ian M. Campbell, Bal Blair, Invershin, who seconded, said that they of the Highland Society appreciated more than anyone else what the work entrusted to the Local Committee really meant, and its importance in the making of the Show a success. They would agree with him that the Dundee Show reflected high credit on the Local Committee. The Committee had to work with the co-operation of the Magistrates and Council of the city, and he paid tribute to the members of the Dundee Corporation for what they had done. He thought they would agree that the combined efforts of all those gentlemen had set a lead to other centres in Scotland in which the Show would be held in the future. It would be hard to come up to the standard of Dundee.

The vote of thanks was heartily accorded.

His Grace the Duke of Atholl acknowledged the vote of thanks on behalf of the Committee. So far as he himself was concerned, he said, it was absolutely undeserved, because his share of the work had simply been to spend two or three very pleasant days in Dundee. The Show had become such a gigantic affair nowadays, and so many things had to be attended to, that it practically had to be run from headquarters. At the same time the Local Committee had proved loyal and efficient throughout in carrying through the arrangements. It was perfectly unnecessary for him, as Convener of it, to do anything, because they had a man on the spot, the Lord Provost, and one very soon realised why he had been made Lord Provost of Dundee. He would like to say how grateful the Directors and the Local Committee were to the attending members. It was a tiring job and a thankless one. They were cut away from their friends and also from their beasts—altogether it was a very altruistic job—and he wished to thank them for the way they played up during the Show. He had been 'told off' for not exhibiting many animals recently, but the reason was that he was supposed not to have any animals. He would, however, see if that matter could not be put right. He supposed, as a Perthshire man, he ought to resent the Show being in Dundee, but having come there, and it having been such a success, he thought Dundee was not a bad place for a Perthshire man to come to for penitence.

Mr J. P. Ross-Taylor, Mungoswalls, Duns, submitted a resolution expressing the Society's appreciation of the satisfactory arrangements made by the railway companies for the transport of stock, implements and visitors to the Show. As an individual he was not conscious that he had ever spent very much time in praising the railway companies, but as one of the Directors of the Society he entirely endorsed the sentiments expressed in the resolution. It was only on an occasion such as this that one was able to appreciate what could be done by the railway companies, when they put their minds into it, in the way of helping the Show to be the success it was proving to be at Dundee. The disappointments, which, if he might say so, they frequently met at their home stations, entirely disappeared when they realised the great efficiency displayed by the railway companies in bringing train-load after train-load of live-stock and machinery to the stations in the city. It might have been thought that the goods carried by the railways on this occasion would have shown a very large increase, but he regretted to say that was not the case. While the machinery section showed quite a good return, the live-stock section showed a very great falling off. He was not going to enter into the why or the wherefore of that. These two great industries, agriculture and the railways, might be described as the two great depressions in Scotland at the present time. They were told that the chief reason was lack of organisation. The prosperity of the one was dependent, to a large measure, on the success of the other. One of the essentials for a prosperous agriculture was cheap freight and a convenient service. Agriculture had tried to follow the lead given it by Whitehall in seeking a somewhat elusive will-o'-the-wisp, quantitative control of imports. The railway companies also had their will-o'-the-wisp. He hoped for their sake it was not quite so elusive, but he would ask them to remember that if they did manage to catch their will-o'-the-wisp they would see to it that it would not be hurtful to what ought to be their best customer.

Lord Rowallan, seconding the resolution, said that, like the proposer of the motion, he had in the past, particularly in the years following the war, had complaints against the railway companies; but he felt sure he was expressing the sentiments of all exhibitors when he said that during the last three years the railway companies had done their best on every possible occasion to assist the exhibitors at the Show. In the last few years he did not think he had heard a single complaint from any exhibitor in this respect. They realised the difficulties of the sudden flow of traffic on one point; they realised the disorganisation it caused; and they appreciated to the full the efficiency of the services which the railway companies provided. As an exhibitor he would like to say that while at one time he tried, as far as possible, to send his exhibits by road, he was quite determined now that all, except for short distances, would go by rail.

The motion was adopted.

Mr James Calder, General Manager for Scotland, L.N.E.R. Company, replying on behalf of the railway companies, said that in these latter days, when it was felt by some people that the railways were not playing the part they formerly played in the matter of transport, it came as what might be described as 'refreshing fruit' to find a resolution such as had been passed. He would like to assure them that the railways were still in the forefront so far as transport was concerned. Evidence had already been given of what the companies had done in connection with the Show, and he might say, so far as his own company was concerned—the London and North Eastern—they conveyed to Dundee no less than 300 waggons containing machinery and implements, and 150 waggons containing live-stock. The railway companies had always been out to do their best for the Highland Show, and that would be their policy in the future. Something had been said about the depressed state of agriculture, and the railways and agriculture might well be regarded as brothers in affliction. But they were looking forward to happier times, and he was sure they would agree that behind the clouds the sun was still shining, and sooner or later the Old Country and its industries would come back to their own. Before closing he should like to say that the railway companies would not have been able to accomplish what they did at Dundee if it had not been for the valuable assistance of Mr Stirton, who was always a friend in need.

Sir Ralph Anstruther of Balcaskie, Bart., proposed a very hearty vote of thanks to the Royal President, not only for his conduct in the chair, but also for having so honoured the Show. "I think," he said, "you are well aware of the great enthusiasm which was created in our Society when it was known that your Royal Highness was prepared to act as President. We knew that that would have a very beneficial effect upon the membership of the Society and upon the Society's Show. We also knew that, trained as you have been, if I may say so, to act in the public interest on every occasion, you would not fail to help us by coming and taking the chair as President of this Show."

The motion was carried with acclamation, the members rising and applauding with great heartiness.

His Royal Highness, in reply, said: Sir Ralph Anstruther, my Lords, ladies and gentlemen, I thank you very much for the kind words you have used in thanking me for being in the Chair at this Meeting. I can only say again what a great pleasure it has been to me to be President of the Highland and Agricultural Society's Show in Dundee, and I thank you all very much for the warm welcome you have given to the Duchess of York and myself.

ANNIVERSARY GENERAL MEETING, 10TH JANUARY 1934.

Colonel F. J. Carruthers of Dormont, Lockerbie, Hon. Secretary, in the Chair.

Chairman.

Mr Alexander Murdoch, Chairman of Directors, expressed regret that the Earl of Home, K.T., President of the Society, was unable to be with them that afternoon owing to a family bereavement. He was sure they were all very sorry that the President was unable to be present. In his absence, and in the absence of the Vice-Presidents, he moved that Colonel F. J. Carruthers of Dormont be asked to take the Chair, and this was unanimously agreed to.

Colonel F. J. Carruthers, in taking the Chair, associated himself with the remarks made by Mr Murdoch regarding the absence of the President.

Annual Report.

Mr Alexander Murdoch submitted the Annual Report by the Directors. He said he had pleasure in submitting that Report, which was a new departure in the practice of the Society. He thought it was an improvement, and the credit of suggesting the preparation of a Report in this form was due to Colonel Carruthers. Certain parts of the Report would be the subject of separate Resolutions and he would not deal with them at that time.

Mr Murdoch then proceeded to deal briefly with other parts of the Report, including Membership, the Dundee Show and the Glasgow Show. With regard to the latter he said that in 1925 Glasgow created a record, and up to last year they held the record. He hoped that, with the assistance of all the Directors in the Glasgow Show Division, the public in Glasgow and the Town Council of Glasgow, they would make an endeavour to beat the great record that was created at Dundee.

Mr Murdoch then formally moved the adoption of the Report, which had been printed and circulated to all Members of the Society. The Report was unanimously adopted.

Election of two Directors.

On the motion of Mr Alexander Murdoch, Colonel R. W. Walker, Culter House, Milltimber, was elected a Director to fill the vacancy caused by the resignation of Mr Falconer L. Wallace of Candacraig; and Mr J. Harling Turner, Portland Estate Office, Kilmarnock, was elected an Extraordinary Director to fill the vacancy caused by the death of Mr Gavin Hamilton, Lesmahagow.

Election of Members.

The Secretary submitted a list of 123 applicants for membership of the Society. These were balloted for and duly elected.

Annual Accounts.

Mr Alexander Murdoch, in the absence of the Treasurer, Sir Ralph Anstruther, Bt., submitted the Accounts for the year ended 30th November 1933. The total funds amounted to £167,393, which showed an increase of £17,435 over the previous year, this being accounted for by the fact that certain of the Investments had appreciated in value. During the year there was a balance of receipts of £5557. Of this amount £4815 represented profit on the Dundee Show. If they deducted that profit from the total surplus, it left a balance of £700 or £800. He would like to point out that £800 was represented by Life Members' subscriptions, so that, apart from the Dundee profit, there was really no surplus on the ordinary revenue of the Society. He wanted to emphasise that, because he noticed, after the Dundee Show, several people writing about the Highland Society hoarding up money, and not spending what they ought to spend. Apart from the profit on the Dundee Show they spent every penny of revenue they got. He had taken the trouble to go through the Accounts of the past seven years to find out the position so far as revenue was concerned, and, if they excluded Capital items, there was a deficit of £700 or £800. During these seven years they had spent between £8000 and £9000 in grants to various Agricultural Institutions. He moved that the Accounts be adopted.

Mr James R. Lumsden of Arden seconded, and the Accounts were adopted.

Special Grants.

Mr Murdoch formally moved the approval of the following Special Grants:—

(*a*) £1000 to the Scottish Committee on Contagious Bovine Abortion, towards the expenses of a proposed investigation by the Animal Diseases Research Association, in an attempt to produce a killed culture vaccine. The grant to be given in three equal payments, over a period of three years, and to be subject to the condition that the Committee in charge of the investigation is successful in raising the balance of the sum required to enable it to carry through the work on the scale proposed.
(*b*) £500 to the Royal Scottish Agricultural Benevolent Institution.
(*c*) £100 to the Scottish Agricultural Organisation Society.
(*d*) £10 to the Scottish Society for the Prevention of Cruelty to Animals.

Mr James R. Lumsden seconded, and the Special Grants were approved.

Argyll Naval Fund.

Colonel F. J. Carruthers submitted the Report on the Argyll Naval Fund for 1932-33, which showed that the nominal capital of the fund amounted to £9846, 16s. 3d. The income for the year amounted to £331, 13s. 6d., whilst the expenditure was £320, 17s. 6d., comprising grants of £40 each to seven Naval Cadets, £20 to one Naval Cadet, and £20, 17s. 6d. miscellaneous expenses.

Honorary Members.

Colonel F. J. Carruthers moved the election of the following Honorary Members, as recommended by the Board of Directors:—

His Royal Highness The Duke of York.
Her Royal Highness The Duchess of York.
The Right Hon. Walter E. Elliot, M.P., Minister of Agriculture.
The Right Hon. Sir John Gilmour, Bt., M.P., Home Secretary.
Sir E. John Russell, Director, Rothamsted Experimental Station.
Sir Rowland H. Biffen, Professor of Agricultural Botany, Cambridge University, and Consulting Botanist to the Royal Agricultural Society of England.
Professor R. G. Stapledon, Welsh Plant-Breeding Station, University College, Aberystwyth.
Sir Thomas H. Middleton, Development Commission.
Professor J. A. Scott Watson, University of Oxford.
Dr John B. Orr, Rowett Research Institute, Bucksburn, Aberdeen.
Principal William G. R. Paterson, West of Scotland Agricultural College, 6 Blythswood Square, Glasgow.
Emeritus-Professor Robert Wallace, Edinburgh.

Colonel Carruthers referred to the fact that the first two on the list were the Duke and Duchess of York. The Duke was their President last year, and the presence of His Royal Highness and the Duchess of York on two days of the Dundee Show was largely responsible for the phenomenal success of the Show. The next name was that of The Right Hon. Walter E. Elliot, Minister of Agriculture. All of them, he was sure, would agree that Mr Elliot had done, and was doing, probably more to pull agriculture out of its serious difficulties than any of his predecessors, and he thought the Minister of Agriculture meant to continue the good work. His job was not yet finished. Mr Elliot had a practical knowledge of agriculture, and he had inherited his father's determination to see things through, and that was what he was doing now. The next name on the list was The Right Hon. Sir John Gilmour, Bt., who was Minister of Agriculture before he became Home Secretary. He had been one of the Vice-Presidents of the Society, and served for eight years as a Director. He did not propose to refer individually to the remaining eight, because there would be an opportunity, at the Anniversary Dinner on 9th February, of proposing their health.

The Honorary Members were then balloted for and duly elected.

Revision of Bye-Laws.

Mr Alexander Murdoch moved that the alterations in, and additions to, the Society's Bye-Laws, which were approved at the Half-yearly General Meeting on 7th June 1933, and which appear in full in the Minute of Proceedings at that Meeting, be confirmed in terms of the Society's Charters (see pp. 525 and 526 of this volume).

The alterations and additions were unanimously confirmed.

Grants to Local Societies.

Mr James Kilpatrick, Craigie Mains, Kilmarnock, Convener of the Shows Committee, submitted a report on Grants to Local Societies. In 1933, he said, grants of money and medals were given to one hundred Local Agricultural Societies throughout Scotland. The total expenditure under this head, including Long Service Certificates and Medals, amounted to £1055, 12s. 4d. In 1934 the estimated total expenditure was £1076, 9s.

Show of 1936.

Major R. W. Sharpe of The Park, Earlston, moved the following resolution, which had that day been adopted by the Board of Directors:—

> "That, provided a suitable site is available, and satisfactory financial and other arrangements can be made, the Society's Show of 1936 be held in the Border Show Division."

Major Strang Steel of Philiphaugh seconded, and the Motion was unanimously adopted.

Science.

(a) *Report by Entomologist.*

Dr R. Stewart MacDougall, Consulting Entomologist, referred to a special article on the Warble Fly Investigation which he was preparing for next volume of 'Transactions.' He then dealt with recent research and observation work in connection with the Sheep Maggot Fly, and stated that this subject, along with certain others which he mentioned, would be included in his Annual Report in the 'Transactions.' (See pp. 1 to 90 and pp. 170 to 201 of this volume.)

(b) *Report by Chemist.*

Dr J. F. Tocher, Consulting Chemist to the Society, submitted a report on the work done in that department during the past half-year. The substance of Dr Tocher's report appears on pp. 285 to 291 of this volume.

Annual Report.

Mr J. Milne Henderson said he thought they ought to thank the Directors for the form in which the Report was submitted.

Colonel Carruthers said he might say, in reply to that word of appreciation, that the Secretary was very largely responsible for producing that report, and that the credit should go to him.

Vote of thanks.

Colonel W. T. R. Houldsworth of Kirkbride, Maybole, said that in the unavoidable absence of their President, he thought they would agree that their Honorary Secretary, Colonel Carruthers, had very fittingly filled the Chair. He moved that Colonel Carruthers be accorded a very hearty vote of thanks for occupying the Chair and for the expeditious way in which he had conducted the Meeting.

Colonel Carruthers briefly acknowledged.

APPENDIX

PREMIUM BOOK

OF

THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND

1934

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Address for communications:

JOHN STIRTON, Secretary,
8 Eglinton Crescent,
Edinburgh 12.

Telephone: 23655. *Telegraphic Address:* **"Society, Edinburgh."**

GENERAL NOTICE.

The Highland Society was instituted in the year 1784, and incorporated by Royal Charter in 1787. Its operation was at first limited to matters connected with the improvement of the Highlands of Scotland; but the supervision of certain departments, proper to that part of the country, having been subsequently committed to special Boards of Management, several of the earlier objects contemplated by the Society were abandoned, while the progress of agriculture led to the adoption of others of a more general character. The exertions of the Society were thus early extended to the whole of Scotland, and have since been continuously directed to the promotion of the science and practice of agriculture in all its branches.

In accordance with this more enlarged sphere of action, the original title of the Society was altered, under a Royal Charter, in 1834, to The Highland and Agricultural Society of Scotland.

The Society avoids questions of political controversy, but in other public matters of practical concern to agriculture it seeks to guard and promote, by every means in its power, the welfare of all interested in the agriculture of Scotland.

Among the more important measures which have been effected by the Society are—

1. Agricultural Meetings and General Shows of Stock, Implements, &c., held in the principal towns of Scotland, at which exhibitors from all parts of Great Britain, Northern Ireland and the Irish Free State are allowed to compete.
2. A system of District Shows instituted for the purpose of improving the breeds of Stock most suitable for different parts of the country, and of aiding and directing the efforts of Local Agricultural Associations.
3. A scheme of Awards to Farm Workers for long and approved service in Scotland.
4. The encouragement of Agricultural Education, under powers conferred by a supplementary Royal Charter, granted in 1856, and authorising the Society to grant Diplomas to Students of Agriculture; and by giving grants in aid of education in Agriculture and allied sciences. In 1900 the Society discontinued its own Examination, and instituted jointly with the Royal Agricultural Society of England an Examination for a National Diploma in Agriculture.
5. The institution of an Examination for a National Diploma in Dairying, jointly with the Royal Agricultural Society of England and the British Dairy Farmers' Association.
6. The institution of an Examination in Forestry for First and Second Class Certificates.
7. The advancement of the Veterinary Art, by conferring Certificates on Students who have passed through a prescribed curriculum, and who are found, by public examination, qualified to practise. Terminated in 1881 in accordance with arrangements with the Royal College of Veterinary Surgeons.
8. The appointment of a Chemist for the purpose of promoting the application of science to agriculture.
9. The establishment of a Botanical Department.
10. The appointment of an Entomologist to advise members regarding insect pests.
11. The annual publication of the 'Transactions,' comprehending papers by selected writers, Prize Reports, and reports of experiments, also an abstract of the business at Board and General Meetings, and other communications.
12. The management of a fund left by John, 5th Duke of Argyll (the original President of the Society), to assist young natives of the Highlands who enter His Majesty's Navy.

CONSTITUTION AND MANAGEMENT.

The general business of The Highland and Agricultural Society of Scotland is conducted under the sanction and control of the Royal Charters, referred to above, which authorise the enactment of Bye-Laws.

The Office-Bearers consist of a President, Four Vice-Presidents, Thirty-two Ordinary and Twenty Extraordinary Directors, a Treasurer, an Honorary and an Acting Secretary, an Auditor, and other Officers.

The Supplementary Charter of 1856 provides for the appointment of a Council on Education, consisting of Sixteen Members—Nine nominated by the Charter and Seven elected by the Society.

PRIVILEGES OF MEMBERS.

MEMBERS OF THE SOCIETY ARE ENTITLED—

1. *To receive a free copy of the 'Transactions' annually.*
2. *To apply for District Premiums that may be offered, and for Long Service Awards for Agricultural Employees.*
3. *To report Ploughing Matches for Medals that may be offered.*
4. *To Free Admission to the Shows of the Society.*
5. *To exhibit Live Stock and Implements at reduced rates.*

Firms are not admitted as Members; but if one partner of a firm becomes a Member, the firm is allowed to exhibit at Members' rates.

6. *To have Manures and Feeding-Stuffs analysed at reduced fees.*
7. *To have Insect Pests and Diseases affecting Farm Crops inquired into.*
8. *To attend and vote at General Meetings of the Society.*
9. *To vote for the Election of Directors.*

&c., &c.

ANALYSIS OF MANURES AND FEEDING-STUFFS.

The Fees of the Society's Chemist for Analyses made for Members of the Society shall, until further notice, be as follows:—

The determination of *one* ingredient in a single sample of manure or of a feeding-stuff	5s.
The determination of *two or more* ingredients in a single sample of manure or of a feeding-stuff	10s.

These charges apply only to analyses made for agricultural purposes for the sole and private use of Members of the Highland and Agricultural Society who are not engaged in the manufacture or sale of the substances analysed. The charges do not apply to Members whose Subscriptions are in arrears.

If the sample represents a substance bought under a guarantee, and if it is found to be notably deficient, the Consulting Chemist will communicate with the vendor and endeavour to obtain a satisfactory settlement for the buyer.

The Society's Chemist also supplies valuations of manures, according to the Society's scale of units, in cases in which the cash price asked by the seller accompanies the sample.

Chemist.—Mr J. F. TOCHER, D.Sc., F.I.C., Crown Mansions, 41½ Union Street, Aberdeen.

For further particulars, see under Chemical Department.

REPORTS ON THE ANIMAL ENEMIES OF CROP PLANTS AND LIVE STOCK (INCLUDING POULTRY).

The Consulting Entomologist is prepared to send to any Member of the Society a Report on damage or diseases of plants and animals due to animal agency (Insects, Mites, Worms, Snails, Slugs, Birds, and the Smaller Mammals). The charge for examination and report has been fixed at 1s.

Entomologist.—Mr R. STEWART MACDOUGALL, M.A., D.Sc., LL.D., Ivy Lodge, Gullane.

For further particulars, see under Entomological Department.

SEEDS, CROP DISEASES, INSECT PESTS, &c.

The rates of charges for the examination of plants and seeds, reports on crop diseases, insect pests, &c., may be had on application to the Secretary.

TERMS OF MEMBERSHIP, &c.

The influence and usefulness of the Society depend mainly upon its strength in membership. The Members, through the Directors whom they elect, have the practical control of the affairs of the Society. The stronger the body of Members, the greater will be the usefulness of the Society. It will therefore be to both their own and the public advantage if all who are interested in agriculture, and who are not already enrolled, should at once become Members of the Society.

ELECTION OF MEMBERS.

Candidates for admission to the Society must be proposed by a Member, and are elected at the half-yearly General Meetings in January and June. It is not necessary that the proposer should attend the Meeting.

RATES OF SUBSCRIPTION.

Higher Subscription.

The ordinary annual subscription is £1, 3s. 6d., and the ordinary subscription for life-membership is £12, 12s.; or after ten annual payments have been made, £7, 7s.

Lower Subscription.

Proprietors farming the whole of their own lands, whose rental on the Valuation Roll does not exceed £500 per annum, and all Tenant-Farmers, Secretaries or Treasurers of Local Agricultural Associations, Factors resident on Estates, Land Stewards, Foresters, Agricultural Implement Makers, Grain, Seed and Manure Merchants, Agricultural Auctioneers, Cattle Dealers and Veterinary Surgeons, none of them being also owners of land to an extent exceeding £500 per annum, and such other persons as, in respect of their official or other connection with agriculture, the Board of Directors may consider eligible, are admitted on a subscription of 10s. annually, which may be redeemed by one payment of £7, 7s., and after eight annual payments of 10s. have been made, a Life Subscription may be purchased for £5, 5s., and after twelve such payments, for £3, 3s.

It must be stated on behalf of Candidates claiming to be on the Lower Rate of Subscription, 10s., under which of the above designations they are entitled to be placed.

Subscriptions are payable on election, and afterwards annually in January.

According to the Charter, a Member who shall not have objected to his election, on the same being intimated to him by the Secretary, cannot retire until he has paid, in annual subscriptions or otherwise, an amount equivalent to a life composition.

Members are requested to send to the Secretary the names and addresses of Candidates proposed for admission to the Society, at the same time stating whether the Candidates should be on the £1, 3s. 6d. or 10s. rate.

Patron of the Society—HIS MAJESTY THE KING.

OFFICERS AND DIRECTORS FOR 1933-1934.

President.

The Earl of Home, K.T., Douglas Castle, Lanarkshire.

Vice-Presidents.

The Duke of Montrose, C.B., C.V.O., Buchanan Castle, Drymen.
Maclachlan of Maclachlan, Castle Lachlan, Strathlachlan.
Sir Hugh Shaw-Stewart, Bt., K.C.B., Ardgowan, Inverkip.
The Right Hon. Alexander B. Swan, Lord Provost of the City of Glasgow, City Chambers, Glasgow.

Ordinary Directors.

Year of Election.	
1930	James Kilpatrick, Craigie Mains, Kilmarnock.
	J. P. Ross-Taylor, Mungoswalls, Duns.
	Robert Miller, Ferrygate, North Berwick.
	Colonel R. W. Walker, Culter Lodge, Milltimber, Aberdeenshire (elected 10th January 1934).
	J. E. Kerr of Harviestoun, Dollar.
	Robert Macmillan of Holm of Dalquhairn, Woodlea, Moniaive.
	Charley Tinker, Kilmartin, Inverness.
	John M. Roger, Balgove, St Andrews.
1931	Alexander Forbes, Rettie, Banff.
	Major S. Strang Steel of Philiphaugh, Selkirk.
	John E. B. Cowper, Gogar House, Corstorphine, Midlothian.
	James M'Laren, Cornton, Bridge of Allan.
	John Hewetson, Baltersan, Newton-Stewart.
	Ian M. Campbell, Bal Blair, Invershin.
	Alexander Clark, Strathore House, Thornton, Fife.
	Captain John C. Stewart of Murdostoun, Newmains.
1932	Captain Thomas Elliot, Thirlestane, Lauder.
	Phipps O. Turnbull, Bowmont, Dunbar.
	T. G. Wilson, Carbeth Home Farm, Balfron Station.
	W. P. Gilmour, Balmangan, Kirkcudbright.
	Alexander Munro of Leanach, Culloden Moor, Inverness.
	Gavin Ralston, Glamis House, Glamis.
	George Buchanan, Hunterhill Farm, Paisley.
	James Durno, Crichie, Inverurie.
1933	Dr T. G. Nasmyth, Canaan Lodge, 43 Canaan Lane, Edinburgh.
	John W. Prentice, Craigrie Farm, Clackmannan.
	James Wyllie, Tinwald Downs, Dumfries.
	William Fraser, Knockomie, Forres.
	Thomas Clark, Muirtons, Perth.
	Lord Rowallan, Rowallan, Kilmarnock.
	George Grant, Glenfarclas, Blacksboat.
	The Hon. Walter T. H. Scott, Master of Polwarth, Harden, Hawick.

Extraordinary Directors.

Year of Election.	
1932	Alexander Murdoch, East Hallside, Cambuslang, Lanarkshire.
	Robert Park, Brunstane, Portobello.
	James R. Lumsden of Arden, Dumbartonshire.
	Thomas Templeton, Sandyknowe, Kelso.
	Archibald Whyte, Spott, Kirriemuir.
1933	Major Robert W. Sharpe of The Park, Earlston.
	John P. Sleigh of St John's Wells, Fyvie.
	T. Mercer Sharp, Bardrill, Blackford.
	James P. Brown, Dipple, Fochabers.
	John D. Allan, Culthill Implement Works, Murthly.

Show Division Directors.

1933	William Brown, Craigton, Bishopton.
	Bailie Donald C. Fletcher, 5 Kirklee Gardens, Bellshaugh Road, Glasgow.
	John M. Hannah, Girvan Mains, Girvan.
	Colonel W. T. R. Houldsworth of Kirkbride, Maybole.
	Donald Mackelvie, New Lanark, Lamlash.
	James MacKillop, Islay Estate Office, Bridgend, Islay.
	F. A. Rottenburg, 55 West Regent Street, Glasgow.
	John Speir, Newton Farm, Hallside, Glasgow.
	A. A. Hagart Speirs of Elderslie, Houston House, Houston.
	J. Harling Turner, C.B.E., Portland Estate Office, Kilmarnock.

Chief Officials.

Sir Ralph Anstruther of Balcaskie, Bt., Pittenweem, *Treasurer.*
Colonel F. J. Carruthers of Dormont, Lockerbie, *Honorary Secretary.*
John Stirton, 8 Eglinton Crescent, Edinburgh, *Secretary.*
J. G. Yardley, *Chief Clerk.*
John Watt, *Second Clerk.*
George James Gregor, C.A., 8 York Place, Edinburgh, *Auditor.*
J. F. Tocher, D.Sc., F.I.C., 41½ Union Street, Aberdeen, *Chemist.*
Professor R. Stanfield, A.R.S.M., M.Inst.C.E., F.R.S.E., 24 Mayfield Gardens, Edinburgh, *Consulting Engineer.*
R. Stewart MacDougall, M.A., D.Sc., LL.D., Ivy Lodge, Gullane, *Consulting Entomologist.*
The Very Rev. Charles L. Warr, D.D., 63 Northumberland Street, Edinburgh, *Chaplain.*
Tods, Murray, & Jamieson, W.S., 66 Queen Street, Edinburgh, *Law Agents.*
William Blackwood & Sons Ltd., 45 George Street, Edinburgh, *Publishers.*
Hamilton & Inches, Princes Street, Edinburgh, *Silversmiths.*
Alexander Kirkwood & Son, 9 St James' Square, Edinburgh, *Medallists.*
John Menzies & Co. Ltd., 6 Castle Street, Edinburgh, *Advertising Agents.*
John Reid, 55 Blenheim Place, Aberdeen, *Showyard Erector.*
J. P. Lauder, *Officer and Caretaker.*

Chairman of Board of Directors.

Alexander Murdoch, East Hallside, Cambuslang, Lanarkshire.

Chairmen of Committee.

1 *Argyll Naval Fund* . .	Maclachlan of Maclachlan, Castle Lachlan, Strathlachlan.
2. *Finance, Chambers, and Law*	Sir Ralph Anstruther of Balcaskie, Bt., Pittenweem.
3. *Publications* . . .	Colonel F. J. Carruthers of Dormont, Lockerbie.
4. *Shows*	James Kilpatrick, Craigie Mains, Kilmarnock.
5. *Implements and Machinery* .	Phipps O. Turnbull, Bowmont, Dunbar.
6. *Science*	Major Robert W. Sharpe of The Park, Earlston.
7. *General Purposes* . .	Alexander Murdoch, East Hallside, Cambuslang, Lanarkshire.
8. *Education*	Colonel F. J. Carruthers of Dormont, Lockerbie.
9. *Forestry*	Sir Hugh Shaw-Stewart, Bt., K.C.B., Ardgowan, Inverkip.
10. *Office-bearers* . . .	Alexander Murdoch, East Hallside, Cambuslang, Lanarkshire.

COMMITTEES FOR 1933-1934

1. ARGYLL NAVAL FUND.

Maclachlan of Maclachlan, Castle Lachlan, Strathlachlan, *Convener*.
The Earl of Elgin and Kincardine, K.T., C.M.G., Broomhall, Dunfermline.
Sir John Gilmour, Bt., P.C., D.S.O., M.P., of Montrave, Leven.
J. E. Kerr of Harviestoun, Dollar.
James M'Laren, Cornton, Bridge of Allan.
Sir Hugh Shaw-Stewart, Bt., K.C.B., Ardgowan, Inverkip.
Charley Tinker, Kilmartin, Inverness.
Alexander Murdoch, East Hallside, Cambuslang, Lanarkshire, Chairman, *ex officio*.
Sir Ralph Anstruther of Balcaskie, Bt., Pittenweem, Treasurer, *ex officio*.
Colonel F. J. Carruthers of Dormont, Lockerbie, Honorary Secretary, *ex officio*.

2. FINANCE, CHAMBERS, AND LAW.

Sir Ralph Anstruther of Balcaskie, Bt., Pittenweem, Treasurer, *Convener*.
John E. B. Cowper, Gogar House, Corstorphine, Midlothian.
James Durno, Crichie, Inverurie.
William C. Hunter of Arngask, Glenfarg.
J. E. Kerr of Harviestoun, Dollar.
James R. Lumsden of Arden, Dumbartonshire.
James M'Laren, Cornton, Bridge of Allan.
Robert Macmillan of Holm of Dalquhairn, Woodlea, Moniaive.
Alexander Munro of Leanach, Culloden Moor, Inverness.
Alexander Murdoch, East Hallside, Cambuslang, Lanarkshire.
J. P. Ross-Taylor, Mungoswalls, Duns.
Major Robert W. Sha rpeof The Park, Earlston.
Phipps O. Turnbull, Bowmont, Dunbar.
Colonel F. J. Carruthers of Dormont, Lockerbie, Honorary Secretary, *ex officic*.
George James Gregor C.A., Auditor, *ex officio*.

3. PUBLICATIONS.

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JAMES P. BROWN, Dipple, Fochabers.
JOHN E. B. COWPER, Gogar House, Corstorphine, Midlothian.
JAMES DURNO, Crichie, Inverurie.
ALEXANDER FORBES, Rettie, Banff.
GEORGE GRANT, Glenfarclas, Blacksboat.
J. E. KERR of Harviestoun, Dollar.
JAMES KILPATRICK, Craigie Mains, Kilmarnock.
JAMES R. LUMSDEN of Arden, Dumbartonshire.
JAMES M'LAREN, Cornton, Bridge of Allan.
ROBERT MACMILLAN of Holm of Dalquhairn, Woodlea, Moniaive.
ALEXANDER MURDOCH, East Hallside, Cambuslang, Lanarkshire.
Dr T. G. NASMYTH, Canaan Lodge, 43 Canaan Lane, Edinburgh.
J. P. ROSS-TAYLOR, Mungoswalls, Duns.
LORD ROWALLAN, Rowallan, Kilmarnock.
The Hon. WALTER T. H. SCOTT, Master of Polwarth, Harden, Hawick.
T. G. WILSON, Carbeth Home Farm, Balfron Station.
Sir RALPH ANSTRUTHER of Balcaskie, Bt., Pittenweem, Treasurer, *ex officio.*

4. SHOWS.

JAMES KILPATRICK, Craigie Mains, Kilmarnock, *Convener.*
JAMES DURNO, Crichie, Inverurie, *Vice-Convener.*
JOHN D. ALLAN, Culthill Implement Works, Murthly.
JAMES P. BROWN, Dipple, Fochabers.
WILLIAM BROWN, Craigton, Bishopton.
GEORGE BUCHANAN, Hunterhill Farm, Paisley.
IAN M. CAMPBELL, Bal Blair, Invershin.
ALEXANDER CLARK, Strathore House, Thornton, Fife.
THOMAS CLARK, Muirtons, Perth.
JOHN E. B. COWPER, Gogar House, Corstorphine, Midlothian.
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Bailie DONALD C. FLETCHER, 5 Kirklee Gardens, Bellshaugh Road, Glasgow.
ALEXANDER FORBES, Rettie, Banff.
WILLIAM FRASER, Knockomie, Forres.
W. P. GILMOUR, Balmangan, Kirkcudbright.
GEORGE GRANT, Glenfarclas, Blacksboat.
JOHN M. HANNAH, Girvan Mains, Girvan.
JOHN HEWETSON, Baltersan, Newton-Stewart.
Colonel W. T. R. HOULDSWORTH of Kirkbride, Maybole.
J. E. KERR of Harviestoun, Dollar.
JAMES R. LUMSDEN of Arden, Dumbartonshire.
DONALD MACKELVIE, New Lanark, Lamlash.
JAMES MACKILLOP, Islay Estate Office, Bridgend, Islay.
JAMES M'LAREN, Cornton, Bridge of Allan.
ROBERT MACMILLAN of Holm of Dalquhairn, Woodlea, Moniaive.
ROBERT MILLER, Ferrygate, North Berwick.
ALEXANDER MUNRO of Leanach, Culloden Moor, Inverness.
ALEXANDER MURDOCH, East Hallside, Cambuslang, Lanarkshire.
Dr T. G. NASMYTH, Canaan Lodge, 43 Canaan Lane, Edinburgh.
ROBERT PARK, Brunstane, Portobello.
JOHN W. PRENTICE, Craigrie Farm, Clackmannan.
GAVIN RALSTON, Glamis House, Glamis.
JOHN M. ROGER, Balgove, St Andrews.
J. P. ROSS-TAYLOR, Mungoswalls, Duns.
F. A. ROTTENBURG, 55 West Regent Street, Glasgow

Lord Rowallan, Rowallan, Kilmarnock.
The Hon. Walter T. H. Scott, Master of Polwarth, Harden, Hawick.
T. Mercer Sharp, Bardrill, Blackford.
Major Robert W. Sharpe of The Park, Earlston.
John P. Sleigh of St John's Wells, Fyvie.
John Speir, Newton Farm, Hallside, Glasgow.
A. A. Hagart Speirs of Elderslie, Houston House, Houston.
Major S. Strang Steel of Philiphaugh, Selkirk.
Captain John C. Stewart of Murdostoun, Newmains.
Thomas Templeton, Sandyknowe, Kelso.
Charley Tinker, Kilmartin, Inverness.
Phipps O. Turnbull, Bowmont, Dunbar.
J. Harling Turner, C.B.E., Portland Estate Office, Kilmarnock.
Colonel R. W. Walker, Culter Lodge, Milltimber, Aberdeenshire.
Archibald Whyte, Spott, Kirriemuir.
T. G. Wilson, Carbeth Home Farm, Balfron Station.
James Wyllie, Tinwald Downs, Dumfries.
Sir Ralph Anstruther of Balcaskie, Bt., Pittenweem, Treasurer, *ex officio*.
Colonel F. J. Carruthers of Dormont, Lockerbie, Honorary Secretary, *ex officio*.
Professor R. Stanfield, A.R.S.M., &c., 24 Mayfield Gardens, Edinburgh, Engineer, *ex officio*.

5. IMPLEMENTS AND MACHINERY.

Phipps O. Turnbull, Bowmont, Dunbar, *Convener*.
J. P. Ross-Taylor, Mungoswalls, Duns, *Vice-Convener*.
John D. Allan, Culthill Implement Works, Murthly.
James P. Brown, Dipple, Fochabers.
William Brown, Craigton, Bishopton.
Alexander Clark, Strathore House, Thornton, Fife.
Thomas Clark, Muirtons, Perth.
John E. B. Cowper, Gogar House, Corstorphine, Midlothian
Alexander Forbes, Rettie, Banff.
William Fraser, Knockomie, Forres.
W. P. Gilmour, Balmangan, Kirkcudbright.
John M. Hannah, Girvan Mains, Girvan.
John Hewetson, Baltersan, Newton-Stewart.
J. E. Kerr of Harviestoun, Dollar.
James M'Laren, Cornton, Bridge of Allan.
Robert Miller, Ferrygate, North Berwick.
Alexander Munro of Leanach, Culloden Moor, Inverness.
Robert Park, Brunstane, Portobello.
John W. Prentice, Craigrie Farm, Clackmannan.
The Hon. Walter T. H. Scott, Master of Polwarth, Harden, Hawick.
T. Mercer Sharp, Bardrill, Blackford.
Major Robert W. Sharpe of The Park, Earlston.
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T. G. Wilson, Carbeth Home Farm, Balfron Station.
James Wyllie, Tinwald Downs, Dumfries.
Alexander Murdoch, East Hallside, Cambuslang, Lanarkshire, Chairman, *ex officio*.
Sir Ralph Anstruther of Balcaskie, Bt., Pittenweem, Treasurer, *ex officio*.
Colonel F. J. Carruthers of Dormont, Lockerbie, Honorary Secretary, *ex officio*.
Professor R. Stanfield, A.R.S.M., &c., 24 Mayfield Gardens, Edinburgh, Engineer, *ex officio*.

6. SCIENCE.

Major ROBERT W. SHARPE of The Park Earlston, *Convener.*
LORD ROWALLAN, Rowallan, Kilmarnock, *Vice-Convener.*
IAN M. CAMPBELL, Bal Blair, Invershin.
JOHN E. B. COWPER, Gogar House, Corstorphine, Midlothian.
JAMES DURNO, Crichie, Inverurie.
ALEXANDER FORBES, Rettie, Banff.
WILLIAM FRASER, Knockomie, Forres.
W. P. GILMOUR, Balmangan, Kirkcudbright.
GEORGE GRANT, Glenfarclas, Blacksboat.
Colonel W. T. R. HOULDSWORTH of Kirkbride, Maybole.
J. E. KERR of Harviestoun, Dollar.
JAMES R. LUMSDEN of Arden, Dumbartonshire.
DONALD MACKELVIE, New Lanark, Lamlash.
JAMES MACKILLOP, Islay Estate Office, Bridgend, Islay.
JAMES M'LAREN, Cornton, Bridge of Allan.
ROBERT MACMILLAN of Holm of Dalquhairn, Woodlea, Moniaive.
ALEXANDER MUNRO of Leanach, Culloden Moor, Inverness.
ALEXANDER MURDOCH, East Hallside, Cambuslang, Lanarkshire.
Dr T. G. NASMYTH, Canaan Lodge, 43 Canaan Lane, Edinburgh.
J. P. ROSS-TAYLOR, Mungoswalls, Duns.
The Hon. WALTER T. H. SCOTT, Master of Polwarth, Harden, Hawick.
A. A. HAGART SPEIRS of Elderslie, Houston House, Houston.
Major S. STRANG STEEL of Philiphaugh, Selkirk.
Captain JOHN C. STEWART of Murdostoun, Newmains.
THOMAS TEMPLETON, Sandyknowe, Kelso.
PHIPPS O. TURNBULL, Bowmont, Dunbar.
ARCHIBALD WHYTE, Spott, Kirriemuir.
T. G. WILSON, Carbeth Home Farm, Balfron Station.
Sir RALPH ANSTRUTHER of Balcaskie, Bt., Pittenweem, Treasurer, *ex officio.*
Colonel F. J. CARRUTHERS of Dormont, Lockerbie, Honorary Secretary, *ex officio.*
J. F. TOCHER, D.Sc., F.I.C., 41½ Union Street, Aberdeen, Chemist, *ex officio.*
R. STEWART MACDOUGALL, M.A., D.Sc., LL.D., Ivy Lodge, Gullane, Entomologist, *ex officio.*

7. GENERAL PURPOSES.

ALEXANDER MURDOCH, East Hallside, Cambuslang, Lanarkshire, Chairman, *Convener.*
ALEXANDER CLARK, Strathore House, Thornton, Fife.
THOMAS CLARK, Muirtons, Perth.
JOHN E. B. COWPER, Gogar House, Corstorphine, Midlothian.
Captain THOMAS ELLIOT, Thirlestane, Lauder.
J. E. KERR of Harviestoun, Dollar.
JAMES M'LAREN, Cornton, Bridge of Allan.
ROBERT MACMILLAN of Holm of Dalquhairn, Woodlea, Moniaive.
ROBERT MILLER, Ferrygate, North Berwick.
Dr T. G. NASMYTH, Canaan Lodge, 43 Canaan Lane, Edinburgh.
ROBERT PARK, Brunstane, Portobello.
JOHN W. PRENTICE, Craigrie Farm, Clackmannan.
The Hon. WALTER T. H. SCOTT, Master of Polwarth, Harden, Hawick.
Major ROBERT W. SHARPE of The Park, Earlston.
PHIPPS O. TURNBULL, Bowmont, Dunbar.
Sir RALPH ANSTRUTHER of Balcaskie, Bt., Pittenweem, Treasurer, *ex officio.*
Colonel F. J. CARRUTHERS of Dormont, Lockerbie, Honorary Secretary, *ex officio.*

8. EDUCATION.

Colonel F. J. Carruthers of Dormont, Lockerbie, Honorary Secretary, *Convener.*
Sir Ralph Anstruther of Balcaskie, Bt., Pittenweem, Treasurer.
James M'Laren, Cornton, Bridge of Allan.
Alexander Murdoch, East Hallside, Cambuslang, Lanarkshire, Chairman.
J. P. Ross-Taylor, Mungoswalls, Duns.
John Stirton, Secretary, Highland and Agricultural Society of Scotland.

9. FORESTRY.

Sir Hugh Shaw-Stewart, Bt., K.C.B., Ardgowan, Inverkip, *Convener.*
The Duke of Atholl, K.T., G.C.V.O., C.B., D.S.O., M.V.O., Blair Castle, Blair Atholl.
Sir James Inglis Davidson, Saughton Mains, Corstorphine.
The Earl of Elgin and Kincardine, K.T., C.M.G., Broomhall, Dunfermline.
Walter Stewart Fothringham of Fothringham and Murthly, Murthly Castle, Perth.
Sir John Gilmour, Bt., P.C., D.S.O., M.P., of Montrave, Leven.
F. N. M. Gourlay, Kirkland, Tynron, Thornhill, Dumfriesshire.
The Earl of Home, K.T., Douglas Castle, Lanarkshire.
J. H. Milne Home, Irvine House, Canonbie.
J. E. Kerr of Harviestoun, Dollar.
James R. Lumsden of Arden, Dumbartonshire.
A. D. Macdonald, Lennie Mains, Cramond Bridge.
Maclachlan of Maclachlan, Castle Lachlan, Strathlachlan.
J. T. M'Laren, 7 Park Place, Stirling.
Sir Herbert E. Maxwell of Monreith, Bt., K.T., D.C.L., LL.D., F.R.S., Whauphill.
Lord Polwarth, Humbie House, Humbie, East Lothian.
Lord Scone, M.P., Scone Palace, Perth.
The Hon. Walter T. H. Scott, Master of Polwarth, Harden, Hawick.
A. A. Hagart Speirs of Elderslie, Houston House, Houston.
Major Mark Sprot of Riddell, Hawick.
The Earl of Stair, D.S.O., Lochinch, Castle-Kennedy.
Major S. Strang Steel of Philiphaugh, Selkirk.
Sir John Maxwell Stirling-Maxwell of Pollok, Bt., K.T., Pollok House, Pollokshaws.
Charley Tinker, Kilmartin, Inverness.
Alexander Murdoch, East Hallside, Cambuslang, Lanarkshire, Chairman, *ex officio.*
Sir Ralph Anstruther of Balcaskie, Bt., Pittenweem, Treasurer, *ex officio.*
Colonel F. J. Carruthers of Dormont, Lockerbie, Honorary Secretary, *ex officio.*

10. OFFICE-BEARERS.

Constitution : (1) The four Ordinary Directors for the Division in which the Show for the year is to be held (with the exception of one retiring next year); (2) one Ordinary Director from each of the other Show Divisions; and (3) the Chairman of the Board, Treasurer, and Hon. Secretary, *ex officiis.*

Aberdeen .	Alexander Forbes, Rettie, Banff. James Durno, Crichie, Inverurie. George Grant, Glenfarclas, Blacksboat.
Borders .	Major S. Strang Steel of Philiphaugh, Selkirk.
Stirling .	James M'Laren, Cornton, Bridge of Allan.
Dumfries .	W. P. Gilmour, Balmangan, Kirkcudbright.

Edinburgh . Phipps O. Turnbull, Bowmont, Dunbar.
Inverness . Ian M. Campbell, Bal Blair, Invershin.
Perth . Alexander Clark, Strathore House, Thornton, Fife.
Glasgow . Lord Rowallan, Rowallan, Kilmarnock.

Alexander Murdoch, East Hallside, Cambuslang, Lanarkshire, Chairman, *ex officio*.
Sir Ralph Anstruther of Balcaskie, Bt., Pittenweem, Treasurer, *ex officio*.
Colonel F. J. Carruthers of Dormont, Lockerbie, Honorary Secretary, *ex officio*.

REPRESENTATIVES ON OTHER BODIES.

National Agricultural Examination Board and National Dairy Examination Board.

Colonel F. J. Carruthers of Dormont, Lockerbie.
Sir Ralph Anstruther of Balcaskie, Bt., Pittenweem.
James M'Laren, Cornton, Bridge of Allan.
Alexander Murdoch, East Hallside, Cambuslang, Lanarkshire.
J. P. Ross-Taylor, Mungoswalls, Duns.
John Stirton, *Secretary*, Highland and Agricultural Society of Scotland.

Edinburgh and East of Scotland College of Agriculture.

John Stirton, *Secretary*, Highland and Agricultural Society of Scotland.

West of Scotland Agricultural College.

James Kilpatrick, Craigie Mains, Kilmarnock.

Aberdeen and North of Scotland College of Agriculture.

J. F. Tocher, D.Sc., F.I.C., 41½ Union Street, Aberdeen.

Royal (Dick) Veterinary College.

Dr T. G. Nasmyth, Canaan Lodge, 43 Canaan Lane, Edinburgh.

Glasgow Veterinary College.

Alexander Murdoch, East Hallside, Cambuslang, Lanarkshire.

Scottish Milk Records Association.

George Buchanan, Hunterhill Farm, Paisley.
W. P. Gilmour, Balmangan, Kirkcudbright.
Alexander Munro of Leanach, Culloden Moor, Inverness.

National Trust for Scotland.

Sir Ralph Anstruther of Balcaskie, Bt., Pittenweem.

Royal Scottish Agricultural Benevolent Institution.

Alexander Murdoch, East Hallside, Cambuslang, Lanarkshire.

Association for the Preservation of Rural Scotland.

The Hon. Walter T. H. Scott, Master of Polwarth, Harden, Hawick.

SCOTTISH PLANT REGISTRATION STATION.

Standing Committee of Management.

James Elder, Athelstaneford Mains, Drem. J. P. Ross-Taylor, Mungoswalls, Duns. G. Bertram Shields, Rosebery Farm, Gorebridge.	*Appointed for 5 years from 1st January* 1931.

MEETINGS.

General Meetings.—By the Charter the Society must hold two General Meetings each year, and, under ordinary circumstances, they are held in the months of January and June, for the election of Members and other business. Twenty a quorum.

By a resolution of the General Meeting on 15th January 1879, a General Meeting of Members is held in the Showyard on the occasion of the Annual Show. In 1934 it will be held at Glasgow, on the Wednesday of the Show, at an hour to be announced in the Programme of the Show.

With reference to motions at General Meetings, Bye-Law No. 19 provides that—"At General Meetings of the Society no motion or proposal (except of mere form of courtesy) shall be submitted or entertained for immediate decision unless notice thereof has been given two weeks previously to the Board of Directors, without prejudice, however, to the competency of a motion or proposal, of which due notice has not been given, being remitted to the Directors for consideration, and thereafter being disposed of at a future General Meeting."

Directors' Meetings.—The Board of Directors meet (except when otherwise arranged) on the first Wednesday of each month from November to June inclusive, at 1.30 P.M., and occasionally as business may require, on a requisition by three Directors to the Secretary, or on intimation by him. Seven a quorum.

Committee Meetings.—Meetings of the various Committees are held as required.

Nomination of Directors.—Meetings of Members, for the purpose of nominating Directors to represent the Show Divisions on the Board for the year 1935-1936, will be held at the places and on the days after-mentioned :—

DIVISION.		
1. *Edinburgh.*	Market Buildings, Gorgie, Edinburgh	Wed., 30th Jan. 1935, at 1.
2. *Glasgow.*	North British Station Hotel, Glasgow	Wed., 13th Feb. 1935, at 1.
3. *Stirling.*	Golden Lion Hotel, Stirling	Thur., 14th Feb. 1935, at 1.30.
4. *Perth.*	County Buildings, Cupar	Tues., 19th Feb. 1935, at 2.
	(The Meeting will be held in 1936 and 1937 at Perth; in 1938 at Cupar.)	
5. *Borders.*	Railway Hotel, St Boswells	Thur., 21st Feb. 1935, at 2.
6. *Inverness.*	Station Hotel, Inverness	Tues., 26th Feb. 1935, at 2.
7. *Aberdeen.*	Imperial Hotel, Aberdeen	Fri., 1st Mar. 1935, at 2.30.
8. *Dumfries.*	King's Arms Hotel, Dumfries	Wed., 13th Mar. 1935, at 2.

The nomination of a Proprietor or other Member paying the higher subscription must be made in the 1st, 2nd, 4th and 5th Divisions; and the nomination of a Tenant-Farmer or other Member paying the lower subscription in the 3rd, 6th, 7th and 8th Divisions.

Retiring Directors are not eligible for re-election until after the lapse of at least one year.

GENERAL SHOW.

The 103rd Annual Show of Stock, Implements and Machinery, &c., will be held at Bellahouston Park, Glasgow, on 19th, 20th, 21st and 22nd June 1934. For closing dates for Entries, Premiums offered, &c., see 'Regulations and Prize List.'

EXAMINATIONS.

Agriculture. — The Examination in 1934 for the National Diploma in Agriculture will be held at Leeds University, on Thursday, 12th April 1934, and following days. Applications close on 20th February 1934.

Dairying.—The Examination in 1934 (Scottish Centre) for the National Diploma in Dairying will be held at the Dairy School, Auchincruive, Ayr: *Written*—On Thursday, Friday and Saturday, 6th, 7th and 8th September 1934; *Oral and Practical*—On Monday, 10th September 1934, and following days. Applications close on 1st August 1934.

Forestry.—The Examination for the Society's Certificates in Forestry will be held each year in the month of March at the Society's Chambers, 8 Eglinton Crescent, Edinburgh 12, provided a sufficient number of candidates present themselves for examination.

NATIONAL DIPLOMA IN AGRICULTURE

By a Supplementary Charter under the Great Seal, granted in 1856, the Society is empowered to grant Diplomas.

From 1858 to 1899 the Society held an annual Examination for Certificate and Diploma in Agriculture. In 1872 the Free Life Membership of the Society was granted to winners of the Diploma. In 1884 permission was given to holders of the Diploma to append the letters F.H.A.S. to their names.

In 1898 it was resolved by the Royal Agricultural Society of England and the Highland and Agricultural Society of Scotland to discontinue the independent Examinations in Agriculture held by the two Societies, and to institute in their stead a Joint-Examination for a NATIONAL DIPLOMA IN AGRICULTURE (N.D.A.) This Examination is now conducted under the management of "The National Agricultural Examination Board" appointed by the two Societies.

REGULATIONS FOR EXAMINATION IN THE SCIENCE AND PRACTICE OF AGRICULTURE

1. The Societies may hold conjointly, under the management of the National Agricultural Examination Board appointed by them, an Annual Examination in the Science and Practice of Agriculture, at a convenient centre.

2. Candidates who pass the Examination will receive the National Diploma in Agriculture—the Diploma to be distinguished shortly by the letters "N.D.A."

3. The Examination will be conducted by means of written papers and oral examinations.

4. In order to be eligible to sit for the Board's Examination in Agriculture, a candidate must—

(*a*) Present a certificate from a recognised Agricultural College that his attainments in the subjects of *General Botany, Geology, General Chemistry, Physics, and Mechanics*, as attested by class and other examinations, are, in the opinion of the authorities of the College, such as to justify his admission to the Board's Examination; *or* (*b*) Produce evidence that he has passed the 1st B.Sc. or the Intermediate Examination in Science of a British University; *or*

(*c*) Present a School Certificate awarded by a British University Examination Board, and produce evidence that he has continued his study of science for at least a year and has obtained a certificate in Physics, Chemistry and Botany at the Higher Certificate Examination of a British University Examination Board.

(*d*) Present a Leaving Certificate in Science (including Chemistry and Botany) of the Scottish Education Department.

5. In the case of students who satisfy the Board that they have not had the facilities for obtaining the foregoing certificates, the Board will be prepared to consider evidence of equivalent attainment. [Applications under this rule must be lodged *three months* before the date of the annual examination.]

6. *Before sitting for the* PRACTICAL AGRICULTURE *and* FARM MACHINERY AND IMPLEMENTS *papers, all candidates must produce evidence of possessing a practical knowledge of Agriculture obtained by residence on a farm in the British Isles for a period or periods (not more than two) covering a complete year of farming operations.*

7. Candidates will have the option of taking the whole of the following nine papers at one time, or of sitting for a group of any three, four, or five in the first year and the remaining subjects (at one examination) within the next two years :—

SUBJECT.	Maximum Marks.	Pass Marks.
1. Practical Agriculture (First Paper)	400	240
2. Practical Agriculture (Second Paper)	400	240
3. Farm Machinery and Implements	300	150
4. Land Surveying and Farm Buildings	100	50
5. Agricultural Chemistry	200	100
6. Agricultural Botany	200	100
7. Agricultural Book-keeping	200	100
8. Agricultural Zoology	100	50
9. Veterinary Science and Hygiene	200	100
	2100	1130

NOTE.—Candidates taking the Examination in two groups of subjects are recommended to take Agricultural Chemistry and Agricultural Botany in the first group.

8. A candidate who obtains not less than three-fourths (1575) of the aggregate maximum marks (2100) in the entire Examination will receive the Diploma with Honours, provided that he obtains not less than three-fourths (600) of the maximum marks (800) in the two Practical Agriculture papers.

9. Candidates electing to take the entire Examination at one time and failing in not more than three subjects may appear for these subjects in the following year. Failure in more than three subjects will be regarded as failure in the whole Examination.

10. In the case of candidates electing to take the Examination in two groups—

(*a*) A candidate appearing for a group of *three* subjects and failing in a single subject may, *in the case of a first group*, appear for that subject along with the second group, or, *in the case of a second group*, in the following year. Failure in more than one subject will be regarded as failure in the group.

(*b*) A candidate appearing for a group of *four* or more subjects and failing in not more than two subjects may, *in the case of a first group*, appear for these subjects along with the second group, or, *in the case of a second group*, in the following year. Failure in more than two subjects will be regarded as failure in the group.

11. Non-returnable fees must be paid by candidates as follows:—

Entire Examination . . .	Six guineas.
Group of Subjects . . .	Three guineas.
Reappearance for any Subjects .	10/6 per Subject.

12. The Board reserve the right to postpone, abandon, or in any way, or at any time, modify an Examination, and also to decline at any stage to admit any particular candidate to the Examination.

The Examination will take place at Leeds University on Thursday, 12th April 1934, and following days.

Forms of application for permission to sit at the Examination may be obtained from "The Secretary, Royal Agricultural Society of England, 16 Bedford Square, London, W.C. 1," or from "The Secretary, Highland and Agricultural Society of Scotland, 8 Eglinton Crescent, Edinburgh 12," and must be returned duly filled up not later than Tuesday, 20th February 1934, when the Entries will close.

SYLLABUS OF SUBJECTS OF EXAMINATION

PRACTICAL AGRICULTURE.

1.—First Paper.

1. *British Farming.*—Arable, stock-raising, dairying—Approximate areas covered by the different systems—Typical examples of each—Area in Great Britain under chief crops—Numbers of live stock—The recent history of agriculture—Short summary of agricultural returns.

2. *Climate.*—The effect of climate on farming practice—Rainfall—Temperature—Prevailing winds—Weather forecasts.

3. *Soils.*—The influence of geological formations on the systems of farming—Classification of soils—Character and composition—Suitability for cultivation—Reclamation—Drainage—Irrigation—Warping—Application of lime and marl—Bare fallows—Tillage—Subsoiling—Deep and thorough cultivation.

4. *Manures.*—The manures of the farm—The treatment of farmyard manure—The disposal of liquid manure and sewage—General manures—Special manures—Field trials of manures—The application of manures—Period of application and amounts used per acre—Unexhausted value of manures and feeding-stuffs.

5. *Crops.*—Wheat, barley, oats, rye, beans, peas, potatoes, turnips, swedes, mangolds, sugar beet, forage plants, hops, and other crops—Their adaptation to different soils and climates—Varieties—Selection of seed—Judging seeds—Cultivation, weeds and parasitic plants, best methods of prevention and eradication—Harvesting—Storing—Cost of production—Improvement of crops by selection and hybridising—Field trials—Methods which the farmer may adopt—Selection to resist disease—The principles of rotations—Rotations suitable for different soils and climates—Rotations and the maintenance of fertility—Green manuring—Leguminous crops in rotation—Catch crops—The advantages and disadvantages of rotations—Specialised farming—Management of Orchards.

2.—Second Paper.

6. *Live Stock.*—The different breeds of British live stock—Their origin, characteristics, and comparative merits—Suitability for different districts—Breeding—General principles—Selection—Mating—Crossing—Rearing and general management—Breeding and rearing of horses, cattle, sheep, pigs, and poultry—Rearing colts and raising store stock—The foods of the farm—Their composition and suitability for different classes of stock—Purchased foods—Composition and special value—Rations for different kinds and ages of stock—Cost of producing beef, mutton, pork, and milk—Cost of feeding farm horses.

7. *The disposal of Crops, Produce, and Stock.*—Marketing grain and other crops—Sale of stock—Live weight—Dead weight.

8. *Milk.*—The production and treatment of milk—The manufacture of cheese, butter, &c.—The utilisation of by-products.

9. *Farming Capital.*—Calculations of the stocking and working of arable, stock, and dairy farms—Farm valuations—Rent and taxes.

10. *Labour.*—Organisation of labour—piece-work, time-work—labour costings.

11. *Renting a Farm.*—Indications of condition, productive power, and stock-carrying capacity—Leases—Conditions of occupancy.

N.B.—*It is essential that a candidate know his subject practically, and that he satisfy the Examiner of his familiarity with farm work and management.*

3.—FARM MACHINERY AND IMPLEMENTS.

1. *Power.*—The principle of action, construction, method of working, also care and management of steam engines and boilers, gas, oil and petrol engines and agricultural tractors—Cost and working expenses in connection with the above—Estimation of the brake horse-power of engines—Power derived from water—Measure-

ment of the quantity of water flowing in a stream—General arrangement of water-power plants—Water-wheels—Turbines—Pumps, principle of action and construction—Flow of water through pipes —Hydraulic ram—Windmills.

2. *Agricultural Implements and Machinery.*—The mode of action and the general principles involved in the construction and working of farm implements and machinery—Arrangement of machinery with respect to the power plant—Pulleys and belting—Shafting and bearings—Lubrication—Lifting appliances—Strength and care of chains—Concrete and its use in the construction of simple foundations for engines and machines.

3. *Implements of Cultivation.*—Ploughs—Cultivators—Grubbers—Harrows—Drills—Manure Distributors—Seeding and planting implements.

4. *Implements of Harvesting.*—Mowing and Reaping machines—Rakes—Tedders—Elevators—Potato raisers.

5. *Implements of Transit.*—Carts, waggons, rick lifters, tractors.

6. *Threshing and Food-preparing Machinery.*—Threshing machines, stationary and portable—Screen Winnowers—Hummelers, Chaff cutters—Pulpers—Cake breakers.

7. *Dairy Appliances.*—Milking machines—Cream separators—Churns and other butter-working appliances—Milk delivery cans —Cheese-making utensils—Vats and presses.

N.B.—*Candidates are expected to have had some experience with agricultural machinery and implements under actual working conditions, and to be capable of illustrating their answers, when necessary, by intelligible sketches or diagrams.*

4.—LAND SURVEYING AND FARM BUILDINGS.

1. The use and adjustment of instruments employed in Surveying and Levelling other than the Theodolite.

2. Land surveying by chain—Plotting from field book, and determination of areas surveyed—The simpler "field problems."

3. Levelling and plotting from field book.

4. A knowledge of the various classes of maps published by the Ordnance Survey Department and their Scales.

5. *Roads and Fences.*—The construction and maintenance of farm roads, fences, and ditches.

6. *Land Drainage.*—Methods of draining; mole and pipe drains; cost of construction and maintenance.

7. *Buildings.*—Buildings required on different classes of farms—Economical arrangement of farm buildings—Materials—Construction—Ventilation—Drainage—Water supply—Dimensions of dairy, stables, cowsheds, yard, courts, and piggeries—Accommodation for power—Implement, machinery, and cart sheds—Hay and grain sheds—Shelter sheds—Storage of manure.

N.B.—*Each candidate should have with him at the Examination a pair of compasses, scales of equal parts, including scales of one chain to the inch, 4 feet to the inch, 8 feet to the inch, and the scale fitting the Ordnance map,* $\frac{1}{2500}$ *or 25·344 inches to the mile, a small protractor, a set square, and a straight-edge about* 18 *inches in length.*

5.—AGRICULTURAL CHEMISTRY.

1. *The Atmosphere.*—Its composition and relations to plant and animal life.

2. *Water.*—Rain water—Soil water and drainage—Drinking water—Sewage and irrigation.

3. *The Soil.*—Origin, formation, and classification of soils—Sampling—Analysis—Composition of soils—The chemical and physical properties of soils—The water and air of the soil—Biological changes in the soil—The soil in relation to plant growth—Fertility—Causes of infertility—Improvement of soils.

4. *Manures.*—Theories of manuring—Classification of manures—Origin, nature, and characteristics of manures—Manufacture of manures—Composition, analysis, adulteration, and valuation of manures—Farmyard manure and other natural manures—Green-manuring—Liming, marling, claying—Artificial manures, their origin and manufacture—Fertilisers and Feeding Stuffs Act—Sampling of manures.

5. *Poisons, Antiseptics, and Preservatives.*—General chemical composition and character of insecticides, fungicides, antiseptics, and preservatives used on the farm.

6. *Plants and Crops.*—Constituents of plants—Assimilation and nutrition of plants—Sources of the nitrogen and other constituents of plants—Germination—Action of enzymes—Composition and manurial requirements of farm crops—Food products derived from crops—Manuring experiments.

7. *Animals.*—Composition of animal body—Animal nutrition—Digestion—Assimilation, metabolism, respiration, and excretion.

8. *Foods and Feeding.*—Constituents of foods—Origin, nature, and composition of chief feeding-stuffs—Sampling, analysis, and adulteration of foods—Nutritive value and digestibility of food—Functions of chief food constituents—Energy values—Vitamines—Relation of foods to the production of work, meat, milk, and manure—Manurial residues of foods.

9. *Dairy Chemistry.*—The composition of milk, cream, butter, cheese, &c.—Conditions which influence the composition of milk and milk products—Action of ferments and enzymes on milk and milk products—Milk-testing—Analysis and adulteration of dairy products.

N.B.—*Candidates who are in possession of Laboratory Notes are required to bring them to the Oral Examination in this subject.*

6.—AGRICULTURAL BOTANY.

In addition to a *general knowledge* of the morphology, histology, and physiology of plants, candidates will be expected to possess a *detailed knowledge* of the following subjects :—

The classification of plants of importance in agriculture as shown by a detailed study of the genera, species, and botanical varieties of the British Crop Plants and Weeds included in the following families :—

Ranunculaceæ.
Cruciferæ.
Caryophyllaceæ.
Leguminosæ.
Rosaceæ.
Umbelliferæ.
Compositæ.
Solanaceæ.
Scropulariaceæ.
Labiatæ.
Chenopodiaceæ.
Polygonaceæ.
Liliaceæ.
Gramineæ.

British grasses of agricultural importance: recognition of, at any stage of growth. Habitats of important species. Constitution of the grass flora of good meadows and pastures. Composition of seed mixtures for temporary and permanent leys on various soils. The effects of artificial manures on the flora of grass land.

The weeds of arable and grass land. Poisonous and parasitic weeds. Methods of distribution by seed and vegetatively: of eradication. Weeds as soil indicators. Recognition of the seeds of the common weeds, particularly those characteristically found in clover, grass, &c., seed.

The chief varieties of wheat, barley, oats, clovers, roots, and other farm crops: their suitability for various climatic and soil conditions. The identification of the more important types of cereals by means of their grain characters. Characteristics of good and bad samples of cereals.

Identification of materials used in feeding cakes and meals.

Plant-breeding. Principles of heredity in plants. Pure lines. Fluctuating variability. Selection.

Disease in plants. Diseases due to the effects of parasitic fungi. Resistance to disease: conditions affecting. Fungoid diseases scheduled from time to time by the Ministry of Agriculture and Fisheries.

Yeasts and fermentation.

The general outlines of bacteriology: nitrogen fixation, nitrification, and denitrification. Putrefaction and the bacteriology of milk, butter, and cheese.

N.B.—*Candidates who are in possession of Laboratory Notes are required to bring them to the Oral Examination in this subject.*

7.—AGRICULTURAL BOOK-KEEPING.

1. Advantages of book-keeping to the farmer. Difficulties and how they can be overcome. Objects of book-keeping.

2. General principles of book-keeping. Double-entry system. Description and use of various books. Ledger, journal, cash-book, petty cash-book, day-books, &c. Entering transactions; posting; trial balance; closing the accounts. Single-entry system.

3. Special ledger accounts: Interest, depreciation, rent and rates, improvements, private and household expenses, profit and loss and capital; partnership accounts.

4. Bank business. Opening a bank account. Use of cheques. Deposits and overdrafts.

5. General office work; correspondence, order notes, invoices, rendering accounts, receipts, &c. Filing systems.

6. Farm valuations for book-keeping purposes. Dates for stock-taking and principles of valuation. The farm balance-sheet.

7. Systems of farm book-keeping. Conditions that determine the most suitable system. Advantages and drawbacks of each system.

8. Accounts for the owner-occupier. Treatment of rent. Incidence of rates and tithe in England and Scotland, and their treatment as between farm and estate accounts. Improvements and upkeep and the general principles relating to maintenance claims.

9. Cost accounting. General principles and methods. Advantages, objects, difficulties.

10. Interpretation of results from ordinary and from cost accounts. Precautions necessary. Use of accounts as a guide to efficient management.

11. Income Tax. How the farmer is assessed. Preparation of Income Tax return. Treatment of Income Tax in accounts.

8.—AGRICULTURAL ZOOLOGY.

The Examination is designed to test practical knowledge, and therefore Candidates will be expected to recognise the animals of agricultural importance referred to in the Syllabus.

GENERAL.

A general knowledge of the characteristics of living animals and how they differ from plants.

One-celled animals, *e.g.*, Amoeba, and many-celled animals.

General outline of the classification of animals and the characters on which it is based.

Organic Evolution. Theories of Heredity.

SPECIAL.

I. *Invertebrates.*—A. The Worm Parasites of Stock. Flat and Round Worms. Structure and Life History, for example, of Liver-fluke, Tapeworm, Ascaris. The mode of life and life history of the chief worm enemies of the domesticated animals. Preventive and remedial measures.

B. The Arachnid enemies of Stock: Mange or Scab Mites, Demodex Mites, Ticks. External structure and life history. Control measures.

C. The Insect enemies of Stock: (*a*) External parasites, *e.g.*, gadflies, warble flies, blue-bottles, green-bottles, stable fly, ked, lice. (*b*) Internal parasites, *e.g.*, bot and warble flies.

D. Insects injurious to Crops: Structure and classification of insects. Mode of life and life history of the chief insect pests of agricultural crops.* Control, preventive and remedial measures—natural control; artificial control (Insecticides).

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* *The chief pests are detailed in Pamphlets issued by the Ministry of Agriculture and Fisheries.*

E. Other invertebrates of agricultural importance, *e.g.*, earthworms, eelworms, slugs and snails, centipedes and millepedes, gall mites.

II. *Vertebrates.*—Birds: the commoner birds of farm importance, their recognition and an estimate of their work.

Mammals: Outstanding characters for recognition, and the economic importance of:—

1. Ungulata or Hoofed Mammals, *e.g.*, horse, pig, cattle, sheep, deer.
2. Rodentia or Gnawing Mammals, *e.g.*, hares, rabbits, rats, mice, voles, squirrels.
3. Insectivora, *e.g.*, mole, hedgehog, shrew.
4. Carnivora, *e.g.*, dog, fox, polecat, stoat, weasel, badger.

N.B.—*Candidates who are in possession of Laboratory Notes are required to bring them to the Oral Examination in this subject.*

9.—VETERINARY SCIENCE AND HYGIENE.

1. Elementary anatomy and physiology of the horse, ox, sheep, and pig, and their relation to unsoundness and disease.
2. The general principles of breeding—including the physiology of reproduction, the laws of heredity, the periods of gestation, and the signs of pregnancy in the mare, cow, ewe, and sow.
3. Dentition as a means of determining the age of horses, cattle, sheep, and swine.
4. The management of farm stock in health and disease.

N.B.—*Candidates who are in possession of Laboratory Notes are required to bring them to the Oral Examination in this subject.*

WINNERS OF DIPLOMA IN 1933.

Diploma with Honours.

ALBERT JAMES THOMPSON, South Eastern Agricultural College, Wye, Kent.

Diploma.

GEORGE CAVE ABBOTT, Midland Agricultural College, Sutton Bonington, Loughborough.
ERNEST WALTER BARKER, Seale Hayne Agricultural College, Newton Abbott, Devon.
FRANK BIRCHALL, University of Leeds.
ALFRED JOHN BIRD, Harper Adams Agricultural College, Newport, Shropshire.
GEORGE SWINBURNE BLAIR, University of Leeds.
WALTER CHARLES NICKERSON CHURCHYARD, University College, Aberystwyth.
ROBIN COUSINS, East Anglian Institute of Agriculture, Chelmsford.
THOMAS CROSS CREYKE, University of Leeds.
JOHN DOWNEY, University College, Aberystwyth.
JACK DOYLE, Midland Agricultural College.
WILLIAM CAMPBELL DYER, Seale Hayne Agricultural College.
GEORGE ERIC FEARNSIDE, University of Leeds.
RICHARD JOHN GAYTON, University of Reading.
JOHN ROBERT GILKS, Harper Adams Agricultural College.
FRANCIS GEORGE HAINES, East Anglian Institute of Agriculture.
HENRY CHARLES HARE, University of Leeds.
ALLAN LESTER HEMINGSLEY, Harper Adams Agricultural College.
FRANCIS MICHAEL HOLLIS, East Anglian Institute of Agriculture.
PETER HOLMES, Seale Hayne Agricultural College.
ARTHUR HUTCHINGS, Seale Hayne Agricultural College.
PETER CHRISTIE JACK, Jun., Greigston, Cupar, Fife.
ERIC VINCENT KNIGHT, South Eastern Agricultural College.

James Kerr Lamberton, University of Glasgow and West of Scotland Agricultural College.

William George Lawrance, Seale Hayne Agricultural College.

Cecilia M. E. Philipps Lloyd, Harper Adams Agricultural College.

Alexander M'Arthur, West of Scotland Agricultural College, Glasgow.

Leo John M'Hardy, University College, Aberystwyth.

Edgar Albert Martin, University of Leeds.

Kennethina Matheson, University of Glasgow and West of Scotland Agricultural College.

Thomas Henry Matthews, Seale Hayne Agricultural College.

Dudley Albert Thomas Maynard, Seale Hayne Agricultural College.

James Russell Moffatt, South Eastern Agricultural College.

John Carlisle Nowell, South Eastern Agricultural College.

George C. L. Palmer, University of Reading.

James Parlane, West of Scotland Agricultural College.

Wilfrid Graham Spear Perry, Seale Hayne Agricultural College.

Thomas Mackesy Prossor, Edinburgh and East of Scotland College of Agriculture.

Alexander Murrell Reece, Harper Adams Agricultural College.

Robert Barr Sillar, West of Scotland Agricultural College.

James Paterson Struthers, University of Glasgow and West of Scotland Agricultural College.

Donald George Sutherland, West of Scotland Agricultural College.

Arthur Thomas Thwaites, Seale Hayne Agricultural College.

James Morris Trew, South Eastern Agricultural College.

Frank Newman Turner, University of Leeds.

John Weir, West of Scotland Agricultural College.

Arthur John Whitlock, Seale Hayne Agricultural College.

Harry Wilkinson, Armstrong College, Newcastle-upon-Tyne.

Stephen Williams, University College, Aberystwyth.

John Athelstan Wyatt, Seale Hayne Agricultural College.

Examination Papers of Past Years.

Copies of papers set at past Examinations in Agriculture, so far as available, may be had on application. Price 6d. per set.

N.D.A. Papers available are those for the years 1923-1925 and 1929-1933.

NATIONAL DIPLOMA IN DAIRYING

This Examination, instituted in 1897, is conducted by "The National Dairy Examination Board," appointed jointly by the Royal Agricultural Society of England, the Highland and Agricultural Society of Scotland, and the British Dairy Farmers' Association.

REGULATIONS FOR EXAMINATION IN THE SCIENCE AND PRACTICE OF DAIRYING

1. The Societies may hold annually in England and in Scotland, under the management of the National Dairy Examination Board appointed by them, one or more examinations for the National Diploma in the Science and Practice of Dairying; the Diploma to be distinguished shortly by the letters 'N.D.D.'

2. The Examinations will be held on dates and at places from time to time appointed and duly announced.

3. Forms of Entry for the Examination in England may be obtained from 'The Secretary, Royal Agricultural Society of England, 16 Bedford Square, London, W.C.1,' and must be returned to him duly filled up, with the entry fee, on or before Friday, July 20th, 1934.

4. Forms of Entry for the Examination in Scotland may be obtained from 'The Secretary, Highland and Agricultural Society of Scotland, 8 Eglinton Crescent, Edinburgh 12,' and must be returned to him duly filled up, with the entry fee, on or before Wednesday, August 1st, 1934.

5. Any candidate may enter for the Examination either in England or Scotland, but not in both, and a candidate who has once taken part in an Examination in England cannot enter for an Examination in Scotland, or *vice versa. An exception may be made in favour of a candidate reappearing under Regulation* 11 (3) *provided special application is made at the time of entry.*

6. As a preliminary to the acceptance of any application for permission to enter for the Examination, a candidate must produce :—

(1) A certificate testifying that he or she has attended a Diploma Course in the subjects of the Examination covering *two academic years* at an approved Dairy Training Institution and has satisfied the authorities of the Institution of his or her fitness for admission to the Examination. This period shall include six session months' instruction (consisting of not more than two periods) in practical dairy work.

(2) Evidence that he or she has spent at least six months on an approved Dairy farm and taken part in the work. This period must not run concurrently with the six months' practical training referred to in subsection 1.

A Dairy Farm to be approved must have not fewer than fifteen cows kept in daily milking.

7. A candidate who has already taken a Degree in Agriculture of a British University or a Diploma in Agriculture recognised by the National Dairy Examination Board, will be allowed to enter for the National Diploma in Dairying Examination after one year's training at an approved Dairy Training Institution, providing that such course includes at least six months' training in practical dairy work, and that he or she has worked for at least six months on an approved Dairy Farm.

8. In the Examination a candidate will be required to satisfy the Examiners by means of written papers, practical work, and *viva voce*, that he or she has :—

(1) A general knowledge of the Management of a Dairy Farm, including the rearing and feeding of Dairy Stock, the candidate being required to satisfy the Examiners that he or she had had a thorough training and practical experience in all the details of Dairy work as pursued on a farm.

(2) A thorough acquaintance, both practical and scientific, with everything connected with the management of a Dairy, and the manufacture of Butter and Cheese.

(3) A general knowledge of Dairy Factory Management, Dairy Hygiene, Dairy Engineering, and Dairy Book-keeping.

(4) Practical skill in Dairying, to be tested by the making of Butter and Cheese.

NOTE.—A candidate must be prepared to make any one of the following varieties of Hard Pressed Cheese, the Examiner in Cheese-making having the option of saying during the Examination what variety a candidate shall make :—

AT THE ENGLISH CENTRE : Cheddar, Cheshire, or Derby.

AT THE SCOTTISH CENTRE : Cheddar, Dunlop, or Cheshire.

9. Candidates will have the option of:—
(*a*) Taking the whole Examination at one time; or
(*b*) Taking the Examination in two parts.

A candidate taking the Examination in two parts must take the following subjects at the first sitting: DAIRY FARMING, DAIRY HYGIENE, PRINCIPLES OF DAIRYING, DAIRY FACTORY MANAGEMENT AND DAIRY ENGINEERING, PRACTICAL CHEESEMAKING AND BUTTER-MAKING; the remaining three Papers, CHEMISTRY AND PHYSICS, DAIRY BACTERIOLOGY, and DAIRY BOOK-KEEPING, to be taken at the Examination in the following year.

10. The maximum marks obtainable, and the marks required for a pass in each subject are as follows:—

WRITTEN EXAMINATION—	Max.	Pass.
Dairy Farming	150	90
Dairy Hygiene	100	60
Dairying—		
(*a*) Principles of Dairying	150	90
(*b*) Dairy Factory Management and Dairy Engineering	100	50
Chemistry—		
(*a*) General Chemistry and Physics. (*b*) Dairy Chemistry.	100	60
Dairy Bacteriology	100	60
Dairy Book-keeping	100	50
PRACTICAL EXAMINATION—		
Hard-pressed Cheese-making	200	150
Blue-veined Cheese-making	100	75
Soft Cheese-making	100	75
Butter-making	200	150
	1400	910

Honours will be awarded to candidates obtaining an aggregate of 80 per cent (1120) of the maximum marks (1400) in the Examination, provided that they also obtain at least 80 per cent (400) of the maximum marks (500) in the Dairy Farming, Hygiene, and Dairying papers.

11. A candidate taking the whole Examination at one time:—
(1) who fails in any part of the practical examination shall fail in the whole examination.
(2) who fails in four or more subjects of the written examination shall fail in the whole examination.
(3) who, having passed in the practical examination, fails in not more than three subjects of the written examination may, at the discretion of the Board, appear for those subjects in the following year.

12. A candidate taking the Examination in two parts, and failing in a *single subject* in the first part of the Examination, may, at the discretion of the Board, appear for that subject along with the second part; or, in the case of a *single subject* of the second part, in the following year. Failure in more than one subject will be regarded as failure in that part of the Examination, Failure in any part of the Practical Examination will entail complete failure.

13. The entrance fees will be as follow:—

For the whole Examination taken at one time .	£3	3	0
For the Examination taken in two parts:			
First part	3	3	0
Second part	1	1	0

For reappearance, 10s. 6d. each subject.

14. The Board reserve the right to postpone, to abandon, or in any way or at any time to modify an Examination, and also to decline at any stage to admit any particular candidate to the Examination.

DATES OF EXAMINATIONS.

SCOTLAND.—Thursday, 6th September 1934, and following days, at the Dairy School, Auchincruive, Ayr. Last date for receiving applications, Wednesday, 1st August 1934.

ENGLAND.—At the University and British Dairy Institute, Reading. WRITTEN—Thursday, Friday, and Saturday, 6th, 7th, and 8th September 1934. ORAL AND PRACTICAL—Monday, 17th September, and following days. Last date for receiving applications, Friday, 20th July 1934.

SYLLABUS OF SUBJECTS OF EXAMINATION.

1.—DAIRY FARMING AND DAIRY HYGIENE.

(a) Dairy Farming.

Soils and Crops.—Types of Soils suitable for dairying. Rotations and systems of cropping. Cultivation, manuring and management of grain, root and forage crops used in dairying. Silage. Temporary and permanent pastures, haymaking.

Plant Physiology.—Roots, shoots, flowers, fruit and seeds of agricultural plants.

Dairy Cattle.—Characteristics of different breeds. Relation of conformation and appearance to Milk Yield. Choice of dairy cattle in relation to climate and soil. The milk yields of the more important breeds, and suitability for the milk trade, cream, butter and cheese production.

The management of a Dairy Herd. Cattle breeding and grading up of dairy stock. Calf rearing and management of young stock.

Milk Recording. Systems, and utilisation of results. Details of official schemes.

Foods and Feeding.—Summer and winter feeding of dairy cattle and young stock. Fodder crops and green forage. Roots. Ensilage. Concentrated foods, meals, cakes. Preparation of food. The effect of food on milk and its products.

Pig Keeping.—Characteristics of the more important breeds. The breeding, rearing and fattening of pigs. Production of pork and bacon.

Farm Management.—Systems of dairy farming. The selection, stocking and equipment of typical farms. Organisation of the farm and disposal of produce.

Dairy Economics.—The Dairy Industry of Great Britain and its relationship to Agriculture. The relative importance of the various products. The retail milk trade. Markets, Dairy organisation and co-operation. Modern developments in the Dairy industry. Sources of imported Dairy Produce.

(*b*) Dairy Hygiene.

Animal Physiology.—General functions of the organs of the animal body. Breeding. Parturition. The structure of the udder and the process of milk secretion. Changes which food undergoes during digestion.

Veterinary Science.—The more important diseases of dairy cattle and their treatment. The transmission and eradication of disease.

Milk Hygiene.—Sanitary conditions. Suitability of water supply. Methods of milking and handling of milk. Regulations affecting milk production. Milk in relation to Public Health.

Farm Buildings.—Situation, chief dimensions and construction of cow houses and dairy buildings. Housing for young stock and pigs. Air space and ventilation, drainage and water supply.

II.—DAIRYING.

(*a*) Principles of Dairying.

Milk.—Milking by hand and machinery. Importance of cleanliness. Cooling of milk. Prevention of contamination. Pasteurisation. Sterilisation. Keeping of milk. Milk testing and sampling. Use of Gerber and Babcock Testers. Interpretation of results. Legal standards. Legislation affecting milk production.

Cream.—Separators and their management. Different systems of cream raising and ripening of cream. Changes during ripening. Natural and artificial ripening, and preparation and uses of starters. Preparation of cream for sale. Uses of preservatives. Clotted cream.

Butter.—Churns and butter-making appliances. Preparation of cream for churning. Washing and working butter. Butter milk. Packing and transmission of butter. Selection and keeping of butter. Salting. Use of preservatives. Characteristics of good butter and method of judging. Circumstances affecting the flavour, texture, colour and keeping qualities of butter. Potting butter for keeping. Causes of inferior butter.

Cheese.—Principles of manufacture. Appliances for cheesemaking. The making of the principal varieties of British, Colonial and Continental cheese from cream, whole milk and skim milk. Acidity of milk. Common tests for acidity. Uses of rennet and its substitutes. Whey. Ripening and storage of cheese. Packing and sale of cheese. Making of cream and other soft cheese. Defects in cheese and their causes. Judging cheese.

(*b*) Dairy Factory Management and Dairy Engineering.

Factory Practice.—Milk depots and handling of factory milk. Systems of cooling and refrigeration. Pasteurisation. Factory butter and cheese-making. Milk Powders. Condensed milk. Frozen milk. Ice cream. Dried casein. Fermented milk. Lactose and whey-butter. Margarine manufacture. Equipment of milk depots, butter, cheese and dairy factories.

Factory Management.—Factory routine. Organisation of labour. Handling of milk on arrival at the factory. Methods of dealing with the milk. Milk contracts. Dairy factory legislation.

Dairy Appliances and Machinery.—Appliances used in the production and handling of milk, butter and cheese. Care and management of engines and boilers, dairy factory machinery, refrigerating machinery.

Buildings.—Situation, construction and drainage of creameries, milk depots and dairy factories.

III.—CHEMISTRY.

(*a*) General Chemistry and Physics.

Chemistry.—Elements, compounds and mixtures. Chemical symbols, formulæ and equations. Acids, bases, salts: their distinctive properties. Acidity and alkalinity; their quantitative estimation. The Atmosphere: its constituents and impurities; influence on dairying operations. Water: its constitution; pure and natural waters; impurities in water and whence derived. Importance of a good water supply in dairying. General knowledge of elementary chemistry. Oxygen; hydrogen; carbon; nitrogen; phosphorus and sulphur; common metals; common acids; compounds of potassium, sodium, ammonium, calcium.

Elementary organic chemistry; sugar, milk sugar, starch, alcohol, acetic acid, formaldehyde, butyric acid, lactic acid, glycerine, saponification of fats; albumen, casein, pepsin.

Physics.—The different forms of matter; solid, liquid, gaseous. Specific gravity and instruments for determining it. Temperature and methods of measuring it. Expansion; thermometric scales. Influence of temperature in dairy operations. Atmospheric pressure and its measurement. Hygrometry. Heat and its measurement; specific heat. Latent heat. Conduction. Convection. Radiation. Solution. Filtration. Distillation. Simple machines, such as levers, pulleys and light weighing machines.

(b) DAIRY CHEMISTRY.

CHEMISTRY OF MILK.—The nature, composition, properties and chemical constituents of milk. Microscopical appearances presented by milk. The influence of feeding. The changes which occur in the keeping of milk, and how produced. The natural and artificial souring of milk. Rennet, its nature and uses.

MILK PRODUCTS.—Physical and chemical changes involved in the making and keeping of butter and in the manufacture and ripening of cheese. Separated milk. Condensed milk. Fermented milk. Synthetic milk. The use of preservatives.

DAIRY ANALYSIS.—Analytical methods, their theory and practice. A general knowledge of the methods employed in the chemical analysis of milk, butter and cheese. Adulteration of milk, cream, butter and cheese, the ways in which adulteration is practised, the changes in composition thereby produced, and a general knowledge of the methods employed in detecting the same.

CHEMISTRY OF FEEDING.—The principal constituents of food materials and the functions they severally fulfil. The influence of food constituents on milk production. Assimilation and digestion. The manurial value of foods. Milk and milk products as foods.

N.B.—*Candidates are required to bring to the Oral Examination their Laboratory notebooks in sections* (a) *and* (b) *of this subject certified by their teachers as being the record of their Laboratory work carried out during the course.*

IV.—DAIRY BACTERIOLOGY.

GENERAL BACTERIOLOGY.—Bacteria; their form, classification, growth and reproduction. The microscope and its use. Staining and microscopic examination of bacteria. Methods of isolation and cultivation. Preparation of culture media. Fermentations and chemical changes produced by bacteria. Enzymes and their action. Effects of heat, cold, sterilisation, pasteurisation, disinfectants and preservatives on bacteria and enzymes. Bacteriological examination of water supplies.

BACTERIOLOGY OF MILK.—The changes produced by bacteria in milk. Useful forms and their functions. Harmful forms and their effects. Coagulation, discoloration, taints, &c. Bacteriological and other standards in relation to the cleanliness of milk.

MILK PRODUCTS.—The bacteria concerned in the ripening of cream and butter-making. 'Starters,' their preparation and management. The ripening of hard, soft and blue-veined cheese. Bacteria injurious to milk products, including condensed and dried milk.

DAIRY MYCOLOGY.—Moulds and yeasts in dairy practice. Their form, classification, growth and relation to dairy products.

N.B.—*Candidates are required to bring to the Oral Examination in this subject their Laboratory notebooks certified by their teachers as being the record of their Laboratory work carried out during the course.*

V.—DAIRY BOOK-KEEPING.

Reasons for keeping accounts on the farm and in the dairy factory.

General principles of double-entry book-keeping. Use of day-book, journal, ledger, cash-book, analysis cash-book, and petty-cash book. Preparation of profit and loss account, capital account and balance sheet. Adjustments necessary for the owner-occupier.

Valuations. Basis of valuations for accounting purposes on the farm and in the dairy factory. Dates for stocktaking.

Methods of accounting suitable for dairy farms and factories. Forms for milk-retailing, cheese-making, and butter-making.

Preparation of a cost account for milk production.

Interpretation and use of accounting results, with special reference to their practical application.

Opening a Bank account. Cheques, deposits, and overdrafts.

Assessment of the Farmer for Income Tax purposes.

VI.—PRACTICAL SKILL IN DAIRY WORK.

Candidates must be prepared—(1) to produce before the Examination a satisfactory certificate of proficiency in the milking of cows, signed by a practical Dairy Farmer, and to satisfy the Examiners by a practical test, if so required; (2) to churn and make into Butter a measured quantity of Cream; and (3) to make one Cheese of each of the following varieties: (1) Hard-pressed, of not less than 30 lb. (see Note to Reg. 8 (4)); (2) Veined or blue-moulded, of not less than 10 lb.; and (3) also to make one or other of the following Soft Cheeses: Cambridge, Camembert, Coulommier, or Pont l'Evêque.

WINNERS OF DIPLOMA IN 1933.

SCOTTISH CENTRE.

Diploma with Honours.

JOHN THACKER, Corner House, Reeves Avenue, Newcastle, Staffs.

Diploma.

EDITH JEAN ANDERSON, 64 Murray Place, Stirling.
JANE MILLAR BROWN, Templand, Thornhill, Dumfriesshire.
CHARLES JOHNSTONE BRYDEN, Co-operative Buildings, Irvine Road, Crosshouse, Kilmarnock.
ERIC BUTTERFIELD, Tofts Crescent, Dalry, Ayrshire.
JESSIE CRAWFORD CAMERON, 27 Lamington Road, Cardonald, Glasgow, S.W.2.
THOMAS CROSS CREYKE, 9 The Crescent, Thirsk, Yorks.
ALI HASAN FAHMI, Hummamat-El-Couba, Cairo, Egypt.

JESSIE LAMONT HOOD, 14 Morven Crescent, Troon, Ayrshire.
JAMES KERR LAMBERTON, Cocklebie Farm, Stewarton, Ayrshire.
NAN M'CONACHIE, Cotterton, Brodie, Morayshire.
EVELYN MARR MORRISON, Mill of Wardes, Insch, Aberdeenshire.
JESSIE MUNRO, 17 Burleigh Street, Glasgow, S.W.1.
KATHARINE WRIGHT, "Green Bank," Temple Sowerby, Penrith.

ENGLISH CENTRE.

Diploma with Honours.

RICHARD JOHN GAYTON, The University and British Dairy Institute, Reading.

Diploma.

HELEN MARY BENNETT, The University and British Dairy Institute, Reading.
ELLEN BIRCHALL, Lancashire County Council Dairy School, Hutton, Preston.
LEOPOLD FREDERICK BRINKMAN, East Anglian Institute of Agriculture, Chelmsford.
ELIZABETH GRACE BUNTING, Studley College, Warwickshire.
FREDERICK GEORGE BYFORD, East Anglian Institute of Agriculture, Chelmsford.
JESSIE CHAPMAN, East Anglian Institute of Agriculture, Chelmsford.
ROBIN COUSINS, East Anglian Institute of Agriculture, Chelmsford.
JOHN DOWNEY, University College of Wales, Aberystwyth.
MARY MILDRED ISABEL EATON, Lancashire County Council Dairy School, Hutton, Preston.
WILLIAM JOHN ELGIE, The University and British Dairy Institute, Reading.
JOHN BOYCE FRY, The University and British Dairy Institute, Reading.
FRANCES CHRISTINE GEE, Studley College, Warwickshire.
CONSTANCE OLGA GILL, The University and British Dairy Institute, Reading.
THOMAS GOSS, Seale Hayne Agricultural College, Newton Abbott.
ELLEN MURIEL PARKER GRAY, The University and British Dairy Institute, Reading.
MARJORIE MEHRING HALEY, Lancashire County Council Dairy School, Hutton, Preston.
MARY GRETTA HEATH, Midland Agricultural College, Sutton Bonington, Loughborough.
ARTHUR HUTCHINGS, Seale Hayne Agricultural College, Newton Abbot.
CHRISTOPHER KINGSLEY, East Anglian Institute of Agriculture, Chelmsford.
HILDA KOHN-SPEYER, Studley College, Warwickshire.
ELIZABETH MARION LAITY, The University and British Dairy Institute, Reading.
MONNA DÉSIRÉ LIGHT, Studley College, Warwickshire.
MARY LUMLEY, Lancashire County Council Dairy School, Hutton, Preston.

Dudley Albert Thomas Maynard, Seale Hayne Agricultural College, Newton Abbot.

Mary Hulme Miller, Lancashire County Council Dairy School, Hutton, Preston.

Laura Joan Parry, The University and British Dairy Institute, Reading.

Ronald John Reith, The University and British Dairy Institute, Reading.

Vera Ross, Studley College, Warwickshire.

Cyril Rowe, The University and British Dairy Institute, Reading.

Charles Arthur Stanger, Midland Agricultural College, Sutton Bonington.

Mary Storey, The University and British Dairy Institute, Reading.

Margaret Bowes Taylor, Midland Agricultural College, Sutton Bonington.

Anthony Thomas George Trew, The University and British Dairy Institute, Reading.

Thomas Cox Waterman, Seale Hayne Agricultural College, Newton Abbot.

Ruth May West, The University and British Dairy Institute, Reading.

John Athelstan Wyatt, Seale Hayne Agricultural College, Newton Abbot.

EXAMINATION PAPERS OF PAST YEARS.

Copies of papers set at past Examinations in Dairying, so far as available, may be had on application. Price 6d. per set.

CERTIFICATES IN FORESTRY

The Society grants First and Second-Class Certificates in Forestry.

1. An Examination will be held each year about the month of March.

2. The Examination in 1934 will be held at 8 Eglinton Crescent, Edinburgh, on the 13th, 14th, and 15th March, provided a sufficient number of candidates present themselves for examination.

Forms of application may be obtained from the Secretary, The Highland and Agricultural Society of Scotland, 8 Eglinton Crescent, Edinburgh 12, and must be returned duly completed on or before 21st February 1934.

3. Candidates must possess—1. A thorough acquaintance with the theory and practice of Forestry. 2. A general knowledge of the following branches of study, so far as these apply to Forestry: (*a*) The Elements of Forest Botany and Forest Zoology; (*b*) The Elements of Meteorology and Geology; (*c*) Forest Engineering, including Land and Timber Measuring and Surveying; Mechanics and Construction, as applied to fencing, draining, bridging, road-making, and saw-mills; and Implements of Forestry; (*d*) Arithmetic and Book-keeping.

4. The Examinations are open to candidates of any age, may be both written and oral, and will include such practical tests as may from time to time be decided to apply.

5. The maximum number of marks for each subject is 100; Pass marks for First-Class Certificate—Forestry, 75; all other subjects, 60. Pass marks for Second-Class Certificate—Forestry, 60; all other subjects, 50.

6. A candidate who obtains Pass marks in certain subjects, but fails in others, may come up for these other subjects alone, it being understood that without the special permission of the Society no candidate will be eligible to enter for more than two subsequent Examinations.

7. A candidate who has obtained the Second-Class Certificate may enter again for the First-Class Certificate.

8. Candidates who obtain the First-Class Certificate in Forestry will be elected Free Life Members of The Highland and Agricultural Society of Scotland.

9. The list of students who obtained certificates prior to 1899 appears in the 'Transactions,' Fifth Series, vol. xi. (1899).

The following have since obtained First-Class Certificates :—

Eric Arthur Nobbs, Department of Agriculture, Cape Town,	1899
George Potts, Grey College, Bloemfontein, Orange River Colony,	1899
Duncan S. Rabagliati, 1 St Paul's Road, Bradford,	1901
Frank Scott, Dumfries House Mains, Cumnock,	1903
William T. Stockley, Rose Villa, Garswood, near Wigan,	1906
A. Frank Wilson, C.D.A. (Edin.), Reedieleys, Auchtermuchty,	1907
George Fisher, Farm Brook, Pilling, Garstang, Lancs.,	1909
John Patten, jun., Hulne Park, Alnwick,	1909
Alexander Mitchell, Dalmeny Park, Edinburgh,	1909
John D. Davidson, Brimstage, Birkenhead,	1911
Donald Doull, M.A., A.R.C.Sc., High School, Kelso,	1911
James W. Mackay, Jervaulx Abbey, Middleham, Yorks.,	1915
Harry Watson, Darnaway, Forres,	1915
Reginald Watt Hunter, 94 St George's Terrace, Newcastle-on-Tyne,	1919
John M'Ewen, Monaughty Forest, by Elgin	1922
Alfred Pope, Swinsty Hall. Fewston, Harrogate	1922
William Lyne Watt, Department of Agriculture, P.O. Box 323, Nairobi, Kenya Colony, Africa,	1926
Robert Lindsay, Royal Botanic Garden, Edinburgh,	1930
George Jamieson Thomson, Coatesgate, Auchen Castle, Moffat,	1930

The following have since obtained Second-Class Certificates :—

William Bruce, B.Sc., East of Scotland College of Agriculture, Edinburgh,	1901
Rajappier Swaminathan, 56 Jesus Lane, Cambridge,	1901
Thomas Usher, Courthill, Hawick,	1901
Allan Carruth, Lawmarnock, Kilbarchan,	1905
Alex. M. Lumsden, Newburn Schoolhouse, Upper Largo,	1905
Robert M. Wilson, Laws Cottage, Duns,	1905
Thomas Campbell, Greystoke, Penrith,	1906
Donald Ferguson, Quarry Lane, Lennoxtown,	1906
Charles Penrhyn Ackers, Huntly Manor, Gloucester,	1908
Robert Howie, Beechwood, Arbroath,	1908
John Trotter, D.Sc., 22 West Savile Terrace, Edinburgh,	1908
James A. S. Watson, Downieken, Dundee,	1908
Norman H. Pearson, 52 Percy Park, Tynemouth,	1909
Lionel F. Stobart, Royal Agricultural College, Cirencester,	1911
Alexander George Norrie, Cairnhill, by Turriff,	1913
William Watt, Darnaway, Forres,	1913
William P. Greenfield, 6 Littlefield Lane, Grimsby,	1915
William M'Ghee, Craigbrae, Straiton, Maybole	1932

SYLLABUS OF SUBJECTS OF EXAMINATION

I.—SCIENCE OF FORESTRY AND PRACTICAL MANAGEMENT OF WOODS.

I. *Principles of Scientific Forestry.*—1. The tree : conditions essential for its nutrition and growth. 2. The soil : its physical structure and properties. 3. The different forms of woodland crops. 4. Pure woods and mixed woods. 5. Even-aged and uneven-aged woods. 6. Sylvicultural characteristics of the principal trees, broad-leaved and coniferous, including recently introduced species of sylvicultural value.

II. *Forest Organisation.*—7. General ideas regarding the necessity for a national forest policy. 8. Conditions necessary for the formulation of a regulated system of forest management. 9. Working plans, their compilation, construction, and use.

III. *Practical Management of Forests.*—10. Assessment of the suitability of areas for afforestation purposes. 11. Preparation of areas for planting. 12. Treatment of heather, bracken, scrub. 13. Draining and enclosing. 14. Choice of species for various situations. 15. Seed—harvesting, extraction, storage. 16. Nurseries, temporary and permanent—choice of site, internal lay-out, management, including lifting, packing, and transport of plants. 17. Planting and sowing in the forest—methods suited to various conditions. 18. Natural regeneration by seed. 19. Regeneration by cuttings, layers, stool shoots. 20. Formation of mixed woods, even-aged, uneven-aged, temporary and permanent, use of nurse trees, kinds of nurse trees suitable under different conditions. 21. Tending of young woods. 22. Pruning. 23. Thinning.

IV. *Forest Protection against*—24. Fires, wind, snow, deer, rabbits, squirrels, birds, insects, and fungi.

V. *Timber.*—25. Its technical properties. 26. Its defects. 27. Recognition of different kinds of timber. 28. Processes for increasing its durability.

VI. *Utilisation of Produce.*—29. Uses of wood and other produce. 30. Felling. 31. Conversion. 32. Seasoning. 33. Transport. 34. Measurement, classification, valuation, and marketing of standing timber.

II.—FOREST BOTANY AND FOREST ZOOLOGY.

(*a*) FOREST BOTANY.

The fundamental facts of morphology, physiology, and classification of plants. The structure and function of the plant-cell and the plant-tissues. Their primary distribution. The secondary changes they exhibit in consequence of perennation.

The structure and function of the root and shoot in flowering-plants. Buds, their forms and uses. The flower. The fruit. The seed.

The structure and function of vegetative and reproductive organs of fungi.

Relationship of plants to air, soil, and water. Effect of light, heat, and mechanical agencies upon plants. Nutrition. The nature and elements of the food of plants. Sources of plant-food. The absorption, elaboration, transference, and storage of food. Respiration and transpiration. Parasites and saprophytes. Symbiosis.

Growth of plants in length and thickness. Correlation of growth, pruning. Germination of seeds. Formation of wood and bark. Healing of wounds.

Diseases of plants due to faulty nutrition and unfavourable circumstances of growth. Diseases due to attacks of fungi.

Natural reproduction and propagation by seeds and by buds. Fertilisation of flowers. Hybridisation. Artificial propagation by budding, grafting, layering, and cutting.

The characters of the large groups and classes of the vegetable kingdom. The characters of the families of plants which include the chief timber trees. The botanical characteristics of the principal British forest-trees (including the structural features of their wood). The weeds of the forest and their significance.

(*b*) FOREST ZOOLOGY.

General classification of animals. The differences between Vertebrates and Invertebrates.

Earthworms and their relation to soil formation; life-history and habits.

Snails and Slugs: General characters and habits.

Insects: Structure and metamorphosis. General classification; the orders of insects important in forestry. Habits and life-histories of important insects in the following groups: leaf-eaters, bark and stem borers, root feeders, sucking insects, predaceous and parasitic insects.

Insect Control: Natural control; preventive and remedial measures.

Spiders and Mites: General characters and habits.

Birds: Recognition and relation to forestry of crows, jay, woodpecker, hawks, owls and tits, also game birds.

Mammals: General characters of the main groups represented by the deer, rabbit, hedgehog, and weasel; the relation of these to forestry.

III.—METEOROLOGY AND GEOLOGY.

Meteorology.

The atmosphere, its composition and physical properties. Measurement of pressure and temperature. The barometer. Rain, hail, snow, fog, cloud, dew, the dew-point, hoar frost. Gases injurious to vegetation.

Geology.

The crust of the earth, its structure and denudation. Recognition of igneous, sedimentary, and metamorphic rocks. Weathering of rocks and soils; formation of alluvium, gravels, and glacial deposits. The composition, mode of weathering, and distribution of the various geological formations in the British Isles. The relationship of strata to the configuration of a country and to the overlying soils, rainfall, and drainage.

IV.—FOREST ENGINEERING, INCLUDING LAND AND TIMBER MEASURING AND SURVEYING; MECHANICS AND CONSTRUCTION AS APPLIED TO FENCING, DRAINING, BRIDGING, ROAD-MAKING, AND SAW-MILLS; AND IMPLEMENTS OF FORESTRY.

The use of the level and measuring chain. Chain surveying. Plotting. Levelling and contouring. Measuring and mapping surface areas. Knowledge of the 25″ and 6″ Ordnance Survey maps and their markings. Use of the planimeter. Plane table surveying. The measurement of solid bodies—as timber, stacked bark, faggots, &c., earthwork.

Use and characteristics of materials—as bricks, stone, lime, mortar, cement, concrete, reinforced concrete, iron, steel.

Simple building construction. Roofs of various types. The construction of simple bridges over streams and gullies. Culverts, &c.

The setting out and formation of roads for temporary and permanent use.

Drainage. Gauging of streams. Water-power. Construction of dams, weirs, water channels, &c. The general arrangement and working of estate saw-mills. Timber slides. Forest tramways. Working and management of steam engines and boilers, oil and petrol engines.

The different modes of fencing and enclosing plantations; their relative advantages, durability, cost of construction, and repairs.

Detailed drawings from figured sketches.

V.—ARITHMETIC—BOOK-KEEPING.

1. Arithmetic—including Practice, Proportion, and Decimal Fractions. 2. Book-keeping—including the description of books to be kept, the solution of practical questions in Book-keeping and the preparation of Accounts.

EXAMINATION PAPERS, 1932.

SCIENCE OF FORESTRY AND PRACTICAL MANAGEMENT OF WOODS.

(*All questions to be attempted.*)

1. A proprietor wishes to plant annually 100 acres of forest trees; the trees to be raised in a home nursery. How many acres of nursery ground would be required to produce the requisite number of plants, assuming that two-thirds of the annual acreage would be planted with conifers and one-third with hardwoods?

What proportion of the ground would be required for seed beds; and how would you treat the remainder in order to prepare it for the transplants?

2. What are, in your opinion, the most favourable spacing distances at which to plant trees? Choose any two coniferous species and any two hardwood species, and state the planting distances you would select for each and your reasons for the spacings you indicate.

3. In the management of young plantations what ought to be one's guiding motive with regard to thinning (1) conifers, (2) hardwoods?

4. State how you would treat a Scots pine plantation which is nearing maturity, having in view the re-establishment of a new crop by natural regeneration.

5. Explain the method you would adopt in laying down the boundary line of an extensive plantation, assuming that the area to be planted is of a hilly and exposed nature.

6. A plantation 500 acres in extent, consisting of larch, Scots pine, Norway spruce and a few hardwoods, is for sale. The trees are eighty years old, and the owner wishes to know their approximate value before offering them in the open market. Explain how you would proceed to count, classify, and value the trees.

(*Three hours allowed.*)

FOREST BOTANY AND FOREST ZOOLOGY.

(*a*) BOTANY.

(THREE *questions only to be attempted.*)

1. Describe the water-carriage system in a forest tree. What is the importance of water to the tree?

2. Compare and contrast the flowering parts of any four of the following: oak, pine, lime, alder, ash, laburnum.

3. Give a general description of 'dry rot,' including measures of control.

4. What are the conditions for the germination of seeds? State carefully the parts of a seed and the importance of each.

(*b*) ZOOLOGY.

(TWO *questions only to be attempted, of which No.* 1 *must be one.*)

1. Describe fully any insect enemy of a broad-leaved or coniferous tree that has come under your notice. Give your personal observations.

2. Name any four vertebrate animals of forest importance, and describe each under the headings:—

(1) How you would recognise it ?
(2) Whether you consider it harmful or useful, and why ?
(3) How you would encourage or control it ?

3. Give a general description of spiders and mites in their relation to the forester.

(*Two and a half hours allowed.*)

METEOROLOGY AND GEOLOGY.

(FIVE *questions only to be attempted.*)

1. Show how the weathering of rocks is influenced by varying climatic conditions.

2. Define and write short notes on three of the following: (*a*) Isotherms, (*b*) Monsoons. (*c*) Dew-point, (*d*) Isobars, (*e*) Foehn Winds.

3. What are the geological conditions favourable for the obtaining of an Artesian water supply ? Illustrate your answer by diagrams.

4. Distinguish between 'bed-rock' soils and 'drift' soils, and give an account of the characters of one typical soil from each group.

5. What are the features characteristic of a country which has recently undergone glaciation ?

6. Give an account of the characters and distribution in Great Britain of either the *Cretaceous System* or the *Old Red Sandstone.*

(*One hour and a half allowed.*)

FOREST ENGINEERING.

(*All questions to be attempted.*)

1. The foundations for the walls of a building are to consist of Portland cement concrete. State the composition of the concrete you would use. Describe carefully how the concrete should be prepared.

2. Give the contents, in cubic feet, of the following standing trees, with the details of your figures in the beech and elm :—

Description.	Length in feet.	Quarter girt 5½ feet from the ground over bark.
Oak	21	27½
Larch	49	16
Beech	33	24
Elm	29	22½
Scotch Fir . . .	20	15

3. Draw a line ABCD inclined at about 30 degrees to the horizontal. Take points B and C at distances of 4·5 feet and 6 feet from A and D respectively, BC being 7 feet. Set off perpendiculars BF (6 feet) and CE (8 feet) from B and C. Join AF, FE and ED. The figure ADEF represents, to scale, a section of a cutting 100 feet long.

Estimate the quantity of earth, in cubic yards, to be excavated from the cutting.

4. Make up the following Level Book, and check the accuracy of the work.

Plot the section to a horizontal scale of 1 inch to 1 chain, and vertical scale of $\frac{1}{16}$ inch to 10 feet.

B. S.	I. S.	F. S.	Rise.	Fall.	R. L. in feet.	Distance in Links.	Remarks.
5·75					3·0	0	Peg on shore.
12·6		2·15				30	Bottom of cliff.
8·25		1·5				43	
	4·45					48	Top of cliff.
	3·2					136	
	5·35					140	Edge of road.
	4·65					156	Crown of road.
14·7		5·2				172	Edge of road at wall, 6 ft. high.
	12·2					175	Surface of ground behind wall.
	1·7					296	Path.
11·95		1·7				304	
12·4		3·825				394½	
8·75		4·275				485	
	8·25					505	Bottom of retaining wall.
	4·5					505	Top of ditto.
		3·75				555	Surface of ground at house.

5. One of the lines of a chain survey crosses a pond. Give two methods of finding the distance across the pond without using any instrument for measuring angles.

6. A saw-mill is to be driven by a portable steam-engine and boiler. Show by sketches how you would arrange the various machines in the saw-mill shed with respect to the engine. What provision would you make for bringing the logs up to the saw, &c.? Describe the construction of a suitable form of boiler for this kind of work.

(*Two hours allowed.*)

ARITHMETIC AND BOOK-KEEPING.

I. ARITHMETIC.

(*Only* FOUR *of the following questions to be attempted.*)

Note.—No marks will be awarded to answers unless workings are shown.

1. Find the simple interest on £4800 for 73 days at 5 per cent.

2. It is desired to construct a path along a field 200 yards long, the path to be 4½ feet wide. If the path is to cost 2s. 6d. per square yard, what will be the total cost of constructing the path?

3. A sum of £97, 10s. is received from an auctioneer (he having deducted commission at 2½ per cent) for the sale of 4 cows and 2 pigs. It is known that the sale price of each cow was twice as much as the price received for each pig. What was the sale price of cows and pigs separately before deduction of the auctioneer's commission?

4. If the weight of a cubic foot of wood is 3 lb., what would be the weight of a plank of wood 15 feet long, 1 foot broad and 6 inches thick?

5. You are given 74 stobs and 2 strainers to fence the side of a field 200 yards long. How far apart would you place the stobs?

II. BOOK-KEEPING.

1. From the following transactions prepare a Cash Book and Ledger Accounts:—

1931.					
Jan.	1.	Cash on hand	£25	0	0
„	2.	Cash received for live stock sold: cattle, £45; sheep, £95	140	0	0
„	3.	Paid into bank	140	0	0
„	4.	Sold stobs on credit to W. Wood	14	0	0
„	6.	Received invoice from R. Elder for repairs to mill engine	21	0	0
„	7.	Paid wages for week	7	0	0
„	9.	Paid R. Elder by cheque £20 (discount allowed, £1)	21	0	0

Jan.	12.	Bought manures from W. Duncan & Co., and paid for same by cash	£12	0	0
„	14.	Received cash from W. Wood in payment of his account	14	0	0
„	14.	Drew cash from bank	10	0	0
„	14.	Paid wages for week	7	0	0
„	14.	Bought feeding-stuffs from Drummond Brothers on credit	15	0	0

2. What books, other than Cash Book and Ledger, do you consider necessary to fully record the transactions in Question 1 above? State which transactions you would record in these other books.

3. The following are the assets and liabilities of an estate: Stock of timber, £1000; horses, £50; tractor and engine, £125; sum due to creditors, £250; poultry, £20; lorries and carts, £25; cash on hand, £5; bank overdraft, £12; implements, £200; cattle, sheep and pigs, £1000; property, £4000.

Prepare a statement to show the capital belonging to the proprietor.

(*Two hours allowed.*)

VETERINARY CERTIFICATES AND MEDALS

The Society established a Veterinary Department in 1823, but by an arrangement made with the Royal College of Veterinary Surgeons, the Society's examination ceased in 1881. Holders of the Society's Veterinary Certificate are entitled to become Members of the Royal College of Veterinary Surgeons on payment of certain fees, without being required to undergo any further examination. The number of Students who passed for the Society's Certificate is 1183.

The Society votes annually eleven silver medals for Class Competition to each of the two Veterinary Colleges in Scotland, the one in Edinburgh and the other in Glasgow.

CHEMICAL DEPARTMENT

Chemist to the Society—J. F. Tocher, D.Sc., F.I.C., Crown Mansions, 41½ Union Street, Aberdeen.

The object of the Chemical Department is to promote the diffusion of a knowledge of Chemistry as applied to agriculture among the members of the Society, to carry out experiments for that purpose, to assist members who are engaged in making local experiments requiring the direction or services of a chemist, to direct members in regard to the use of manures and feeding-stuffs, to assist them to put the purchase of these substances under proper control, and in general to consider all matters coming under the Society's notice in connection with the Chemistry of Agriculture.

MEMBERS' PRIVILEGES IN RESPECT OF ANALYSES.

The fees for analyses made for members of the Society shall, until further notice, be as undernoted:—

The scale of fees applies only to analyses made for agricultural purposes for the sole and private use of members of the Highland and Agricultural Society who are not engaged in the manufacture or sale of the substances analysed. The scale does not apply to members whose subscriptions are in arrears.

Manures, Feeding-Stuffs, Soils, and Agricultural Products.

The determination of one ingredient in a single sample of a *manure* or of a *feeding-stuff*, ...	5s.
The determination of two or more ingredients in a single sample of a *manure* or of a *feeding-stuff*, ...	10s.

For example—

Linseed and other cakes, for oil or for albuminoids, .	5s.
Feeding-meals, ground cereals, for oil or for albuminoids,	
Bone-meals, for nitrogen or for phosphate, . .	
Compound manures, for nitrogen or for soluble phosphates, or for insoluble phosphates or for potash, .	
Superphosphate, for soluble phosphate or for insoluble phosphate, ...	
Thomas-phosphate powder, for citric soluble phosphate or for total phosphate, ...	
Linseed and other cakes, for oil and albuminoids, &c., .	10s.
Feeding-meals, ground cereals, for oil, albuminoids, &c.,	
Bone-meals, for nitrogen, phosphate, &c., ...	
Compound manures, for nitrogen, soluble phosphates, insoluble phosphates, and potash, ...	
Superphosphate, for soluble phosphate and insoluble phosphate, ...	
Thomas-phosphate powder, for citric soluble phosphate and total phosphate, ...	

Limestone, giving the percentage of lime,	£0	5	0
Limestone, complete analysis,	1	0	0
Lime, including ground lime, percentage of alkaline lime,	0	5	0
Lime, including ground lime, complete analysis,	1	0	0
Analysis of soil, to determine fertility and recommendation of manurial treatment,	1	10	0
Complete analysis of soil,	2	10	0
Analysis of agricultural products — hay, grain, ensilage, roots, &c.,	1	0	0

(Not more than four samples per annum will be analysed under the Society's scheme for any one member.)

Note to Members sending Samples for Analysis.

The Directors are anxious to take any steps in their power to expose the vendors of inferior fertilisers and feeding-stuffs, and the members can give them assistance in this by supplying to the Chemist, when sending samples for analysis, information as to the guarantee, if any, on which the goods were sold, and also as to the price charged.

Valuations of manures, according to the Society's scale of units, will be supplied if requested.

DAIRY PRODUCE.

Milk, full analysis,	£0	10	0
,, solids and fat,	0	5	0
,, fat only,	0	2	6

(Not more than six samples of milk per annum will be analysed under the Society's scheme for any one member.)

Butter, full analysis,	0	10	0
,, partial analysis (water and fat),	0	5	0
Cheese,	0	10	0

WATER.

Analysis of water to determine purity and fitness for domestic use (the Committee reserve power to refuse from one member more than two samples annually under the Society's scheme).....at the reduced fee of	1	0	0

(Cases containing bottles for water samples and instructions for sampling are sent from the laboratory on application.)

MISCELLANEOUS.

Search for poisons in food or viscera,	£2	0	0

(Veterinary surgeons are not entitled to have searches made for poisons in food or viscera under the Society's scheme for clients who are not members of the Society.)

Sulphate of copper, percentage of copper and purity,	0	5	0
,, ,, complete analysis,	0	10	0
Arsenic, carbolic acid and tar acids, and other poisons used in making sheep dips, insecticides, &c.,	5s. to £1		

Samples should be sent (carriage paid) to Dr J. F. Tocher, Crown Mansions, 41½ Union Street, Aberdeen.

INSTRUCTIONS FOR SELECTING SAMPLES FOR ANALYSIS.

MANURES.

Any method of sampling mutually agreed upon between buyer and seller may be adopted, but the following method is recommended as a very complete and satisfactory one: Four or more bags should be selected for sampling. Each bag is to be emptied out separately on a clean floor, worked through with the spade, and one spadeful taken out and set aside. The four or more spadefuls thus set aside are to be mixed together until a uniform mixture is obtained. Of this mixture one spadeful is to be taken, spread on paper, and still more thoroughly mixed, any lumps which it may contain being broken down with the hand. Of this mixture two samples of about half a pound each should be taken by the purchaser or his agent, in the presence of the seller or his agent or two witnesses (due notice having been given to the seller of the time and place of sampling), and these samples should be taken as quickly as possible, and put into bottles or tin cases to prevent loss of moisture, and having been labelled, should be sealed by the samplers—one or more samples to be retained by the purchaser, and one to be sent to the Chemist for analysis.

FEEDING-STUFFS.

Samples of feeding-stuffs which are in the form of meal may be taken in a similar manner.

Samples of cake should be taken by selecting four or more cakes from the bulk. These should be nutted to a size not larger than walnuts. The nutted cake should then be thoroughly mixed and samples of not less than one pound each taken from it. The samples should be put into bottles or tins, sealed up, and labelled. One sample should be sent to the Chemist, and one or more duplicates retained by the purchaser.

SOILS.

Dig a little trench about two feet deep, exposing the soil and subsoil. Cut from the side of this trench vertical scrapings of the soil down to the top of the subsoil. Catch these on a clean board, and collect in this manner two pounds of soil taken from the whole surface of the section. Similar scrapings of subsoil immediately below should be taken and preserved separately. Five or six similarly drawn samples at least should be taken from different parts of the field, and kept separate while being sent to the Chemist, that he may examine them individually before mixing in the laboratory.

VEGETABLE PRODUCTS.

Turnips, &c., at least 50 bulbs carefully selected as of fair average growth.

Hay, straw, ensilage, &c., should be sampled from a thin section cut across the whole stack or silo, and carefully mixed; above 2 lb. weight is required for analysis.

Grain should be sampled like manures.

DAIRY PRODUCE.

Milk.—Samples of milk from individual cows should be taken direct from the milk-pail after complete milking. Average samples from a number of cows should be taken immediately after milking. Specify whether the sample is morning or evening milk, or a mixture of these. Samples to be tested for adulteration should not be drawn from the bottom or taken from the top of standing milk, but they should be ladled from the vessel after the milk has been thoroughly mixed. Samples of milk should be sent immediately to the Chemist.

For most purposes a half-pint bottle of milk is a large enough sample.

Butter and Cheese.—About quarter-pound samples are required.

WATERS.

When the water is from a well, it should be pumped for some minutes before taking the sample.

If the well has been standing unused for a long time, it should be pumped for some hours, so that the water may be renewed as far as possible.

If the well has been newly dug or cleaned out, it should be pumped as dry as possible, daily, for a week before taking the sample.

Water from cisterns, tanks, ponds, &c., should be sampled by immersing the bottle entirely under the water, and holding it, neck upwards, some inches below the surface. *Water from the surface should not be allowed to enter the bottle.*

Spring or stream water should not be sampled in very wet weather, but when the water is in ordinary condition. Such waters should be sampled by immersing the bottle, if possible; but if not deep enough for that purpose, a perfectly clean cup should be used for transferring the water to the bottle.

When the bottle has been filled the stopper should be rinsed in the water before replacing it.

Interference with or disturbance of wells or springs, or the ground in their immediate vicinity, must be carefully avoided during sampling, and for at least twenty-four hours before it.

After a sample has been taken, it should be sent to the Chemist as speedily as possible.

A description of the source and circumstances of the water should accompany the sample, as the interpretation of the analytical results depends to some extent on a knowledge of such particulars.

Note.—Stone jars and old wine bottles are unsuitable for conveying samples. Winchester quarts chemically cleaned should be obtained from Dr J. F. Tocher, Crown Mansions, 41½ Union Street, Aberdeen.

LOCAL ANALYTICAL ASSOCIATIONS.

With the view of encouraging, as well as regulating the conduct of, Local Analytical Associations, the Society, from 1881 to 1893, contributed from its funds towards their expenses a sum not exceeding £250 annually. In view of the passing of the Fertilisers and Feeding Stuffs Act, 1893, it was decided, at a meeting of the Directors on the 6th of December 1893, to discontinue that grant after the 1st of March 1894.

COMPOSITION AND CHARACTERISTICS OF MANURES AND FEEDING-STUFFS.

(*See* '*Transactions,*' *Fifth Series, vol. xi.*, 1899.)

FORMS OF GUARANTEE

Guarantee of Manure.

I guarantee that the manure called......................and sold by me to ....contains—

Soluble phosphoric acid =Phosphate of lime dissolved............per cent.
Insoluble phosphoric acid=Phosphate of lime undissolved.........per cent.
Potash salts . . =Potash (K_2O) . . . .per cent.
Total nitrogen . . . .per cent.

Signature of seller.......................

Date.............. ..19 .

Guarantee of Feeding-Stuff.

I guarantee that the feeding-stuff called...............and sold by me to ....contains—

. ... per cent albuminoids.
.... per cent oil.

Signature of seller........................

Date. . .. ...19..

PRICES OF FERTILISERS AND FEEDING-STUFFS FOR SEASON 1934.

(Cash Prices as fixed on 8th February. These prices are subject to variation from month to month or oftener.)

SUPERPHOSPHATES.

ITEM TO BE VALUED.	PRICES PER UNIT FOR THE UNDERNOTED PERCENTAGES.		
PHOSPHORIC ACID DISSOLVED . . =TRICALCIUM PHOSPHATE DISSOLVED	13·75 30	16·00 35	18·0 39·3
February Price	£2 12 6	£2 17 6	£3 2 6
Price per Unit	3/9¾	3/7¼	3/5¾

FERTILISERS.

(Other than Superphosphates.)

Name of Fertiliser.	Guarantee.	Price per Ton.			Price per Unit.	
		£	s.	d.	s.	d.
Sulphate of Ammonia (neutral) * . .	20·6 % Nitrogen	7	5	0	7	0½
Basic Slag †‡	14 % Total Phos. Acid =30·60 % Tric. Phos.	2	8	6	3	5½
,, ,, †	15 % Total Phos. Acid =32·75 % Tric. Phos.	2	10	0	3	4
,, ,, †	15·75 % Total Phos. Acid =34·35 % Tric. Phos.	2	12	6	3	4
Potassic Slag	12 % Phos. Acid =26·21 % Tric. Phos. 6 % Potash	3	10	0	P 3 Pot. 3	10½ 11¼
Bone Meal (Home and Indian) .	4 % Nit., 20 % Phos. Acid =43·68 % Tric. Phos.	7	0	0	N 15 P 3	6¼ 10¾
Steamed Bone Flour	0·75 % Nit., 27·5 % Phos. Acid =60·06 % Tric. Phos.	5	17	6	N 15 P 3	5 10¼
Calcium Cyanamide (Nitrolim) ‖ . .	20·6 % Nitrogen	7	5	0	7	0½
Ground Mineral Phosphate § . .	26 % Phos. Acid =56·79 % Tric. Phos.	2	10	0	1	11
,, ,, ,, § . .	34 % Phos. Acid =74·26 % Tric. Phos.	3	10	0	2	0¾
Potassic Mineral Phosphate . .	6 % Pot., 21 % Phos. Acid =45·87 % Tric. Phos.	3	2	6	P 2 Pot. 3	0 5¼
,, ,, ,, . .	9 % Pot., 18 % Phos. Acid =39·30 % Tric. Phos.	3	10	0	P 2 Pot. 3	1 7¼
Nitrate of Soda *	16 % Nitrogen	7	18	6	9	11
Nitro Chalk *	15·5 % ,,	7	5	0	9	4¼
Kainit	14 % Potash	3	2	6	4	5½
Potash Salts	30 % ,,	5	0	0	3	4
Sulphate of Potash	48·5 % ,,	10	2	6	4	2
Muriate of Potash	50 % ,,	8	17	6	3	6½

Ground Lime, in bags (60 % calcium oxide), at Dufftown or Grange, 39/- per ton; (70 % calcium oxide) at Charleston, 35/- per ton; at Dunbar, 32/6 per ton; (75 % calcium oxide) at Cults, 35/- per ton; at Fushiebridge, 32/6 per ton; (85 % calcium oxide) at Cults, 40/- per ton.

English Ground Lime (76 % calcium oxide), to Edinburgh, 42/- per ton; to Lanark, 41/- per ton; to Stirling, 44/- per ton.

English Ground Lime (95 % calcium oxide), to Edinburgh, 50/- per ton, or 6·3 pence per unit.

Ground Limestone (94 % calcium carbonate), to Edinburgh, 29/- per ton; to Lanark, 28/- per ton; to Stirling, 30/- per ton; in six-ton lots. Bags to be returned to sender. At 29/- per ton the price per unit is 3·7 pence.

The prices for all fertilisers are cash prices for two-ton lots in bags at Leith or Glasgow, unless otherwise stated.

* Carriage paid to any railway station in six-ton lots. Four-ton lots 1/- more per ton.

† Price at Leith (5/- less Ex. ship).

‡ The fineness of Basic Slag is such that 80 % of the powder will pass through the standard sieve. § 90 % passing through standard sieve. ‖ Four-ton lots carriage paid.

N.B.—When these units are multiplied by the percentages in the analysis of a Manure, they will produce a value representing very nearly the **cash** price *per ton at which TWO TONS may be bought in fine sowable condition at Leith or Glasgow. Larger purchases may be made on more favourable terms.*

FEEDING-STUFFS.

Name of Feeding-Stuff.	Price per Ton. £	s.	d.
Linseed Cake (Home), 8% Oil, 28% Albuminoids	8	12	6
Cotton Seed Cake (Bombay)	..		
Cotton Seed Cake (Egyptian) at Leith, 4·5% Oil, 22% Albuminoids	4	10	0
Ground Nut Cake—Leith—			
Decorticated (Expeller), 9 % Oil, 41 % Albuminoids	6	10	0
Undecorticated, 8 % Oil, 31 % Albuminoids	5	12	6
Palm Kernel Cake	7	0	0
Decorticated Cotton Seed Cake—8 % Oil, 43 % Albuminoids	7	10	0
Decorticated Cotton Seed Meal—7 % Oil, 42 % Albuminoids	7	10	0
Rice Bran Meal	4	0	0
Broad Bran	6	15	0
Medium Bran	6	5	0

Name of Feeding-Stuff.	Price per Ton. £	s.	d.
Thirds or Parings	5	17	6
Dried Distillery Grains	6	5	0
,, Brewers' Grains	4	12	6
Feeding Treacle	5	2	6
Locust Beans (Kibbled)*	6	7	6
Maize (Round Plate)*	4	17	6
,, (Flaked)*	6	0	0
Beans (Imported Egyptian) (Glasgow)	7	5	0
Bean Meal	7	7	6
Soya Bean Meal (extracted)	7	10	0
,, Cake	7	5	0
Home Oats (Feeding)	6	5	0
White Fish Meal (Aberdeen)	14	10	0
,, ,, (Leith)	15	10	0
,, ,, (Glasgow)	15	10	0
Barley Meal (Home)	8	10	0
" " (Foreign)	6	0	0

* In Railway Sacks.

CLASSIFICATION OF MANURES.

BONE MEALS	Genuine Bone Meal contains about 20 per cent Phosphoric Acid equal to 43·7 per cent Tricalcium Phosphate, and about 4 per cent Nitrogen. If phosphates are low, Nitrogen will be high, and conversely.
STEAMED BONE FLOUR	Ground to flour, and containing 27·5 per cent Phosphoric Acid equal to about 60 per cent Phosphates and about ·8 per cent Nitrogen.
MIXTURES AND COMPOUND MANURES	To be valued according to the following units: Nitrogen, 7/-; Soluble Phosphoric Acid, 3/9; Insoluble Phosphoric Acid, 2/9; and Potash, 4/3. The value so arrived at will be the value at Leith or Glasgow, exclusive of the cost of mixing, bags and bagging, which may be taken on an average at about 20/- per ton.
DISSOLVED BONES	Must be pure—*i.e.*, containing nothing but natural bones and sulphuric acid.

INSTRUCTIONS FOR VALUING MANURES.

The unit used for the valuation of manures is the hundredth part of a ton, and as the results of analyses of manures are expressed in parts per hundred, the percentage of any ingredient of a manure when multiplied by the price of the unit of that ingredient represents the value of the quantity of it contained in a ton.

As an example take muriate of potash; a good sample (see p. 52) will be guaranteed to contain 50 per cent of oxide of potash. All potash manures are valued according to the amount of potash (oxide of potash) they yield, and muriate of potash yields 50 per cent of potash (K_2O)—*i.e.*, 50 units per ton; and as a ton of muriate of potash costs £8, 17s. 6d., the price of the unit is the fiftieth part of that—viz., 3/6½. If on analysis a sample of muriate of potash guaranteed to contain 50 per cent of potash is found to contain only 48 per cent, the price per ton will be 7/1 (twice 3/6½) less—viz., £8, 10s. 5d.

Similarly with all other manures, the price per unit is derived from the price per ton of a sample of good material up to its guarantee, and therefore the proper price per ton of a manure is found by multiplying the price of the unit of the valuable ingredient by the percentage as found by analysis. If a manure contains more than one valuable ingredient, the unit value of each ingredient is multiplied by its percentage, and the values so found when added together give approximately the price per ton of the manure.

Nitrate of soda contains no ammonia, but it contains nitrogen, and 14 units of nitrogen are equivalent to 17 units of ammonia.

The commercial values of manures are determined by means of the Units in the following manner:—

Take the results of analysis of the manure, and look for the following substances:—

Phosphates dissolved (or soluble phosphoric acid)
Phosphates undissolved (or insoluble phosphoric acid)
Total phosphoric acid
Nitrogen
Potash

No other items but these are to be valued.

Should the results of analysis or the guarantee not be expressed in that way, the chemist or the seller should be asked to state the quantities in these terms.

Suppose the manure is ground mineral phosphate—

The proportion of phosphate present in a sample guaranteed to contain 26 per cent phosphoric acid, may be 24 per cent phosphoric acid. The price per unit of phosphoric acid in ground mineral phosphate (26 per cent grade) is 1s. 11d. The value of ground mineral phosphate containing 24 per cent phosphoric acid is therefore 24 times 1s. 11d., equal to £2, 6s. per ton.

Suppose the manure is a superphosphate—say an ordinary superphosphate, 15 per cent soluble phosphoric acid,—the price per unit of phosphoric acid in superphosphate (16 per cent grade) is 3/7¼ at Leith.

It is valued thus—

Soluble phosphoric acid. 15 times 3/7¼, equal to £2, 14s. 1d.

Insoluble phosphoric acid is not valued in a superphosphate.

Suppose the manure is a compound fertiliser containing 4 per cent nitrogen, 7 per cent soluble phosphoric acid, 3 per cent insoluble phosphoric acid, and 4 per cent potash. From the units given on p. 53 for "Mixtures and Compound Manures," the value of this compound fertiliser is obtained as follows:—

The value of the—

Nitrogen will be	£1	8	0	per ton
Soluble phosphoric acid will be .	1	6	3	„
Insoluble phosphoric acid will be	0	8	3	„
Potash will be	0	7	0	„
	£3	19	6	

The value of these manures will thus be £3, 19s. 6d. per ton, exclusive of the cost of mixing, bags and bagging, which may be taken on an average at about 20/- per ton.

Note.—The units have reference solely to the Market Prices of Manures, and not to their Agricultural Values.

TABLE OF COMPENSATION VALUES FOR 1934.

TABLE SHOWING THE VALUE OF FEEDING-STUFFS AS MANURE PER TON, AND THE COMPENSATION VALUE PER TON OF FOOD CONSUMED, BASED ON THE AVERAGE UNIT PRICES OF FERTILISERS FOR 1934.

The following is a Table showing (under Section A) the average proportions of digested nitrogen, undigested nitrogen, phosphoric acid, and potash present in the feeding-stuffs named. The Table also shows the value per unit of nitrogen (digested and undigested), phosphoric acid, and potash, the prices per unit being the value per unit for compound manures prevailing for 1934. Under Section B of the Table is shown the compensation value per ton of food consumed for each of the feeding-stuffs named, based on the unit prices for 1934. Column (1) of Section B of the Table shows the value per ton recovered in dung; Col. (2) of the same section shows the value of the lasting part of dung per ton; while the remaining three columns show the residual values per ton after one crop, two crops, and three crops have been removed.

In accordance with the decision arrived at by the Committee appointed by a representative meeting of Scottish agriculturists, who reported in September 1917 on the "Compensation for Manurial Improvements and Cumulative Fertility," under the Agricultural Holdings (Scotland) Act, 1908, the value of undigested nitrogen per ton as manure is calculated as being 70 per cent of the value of digested nitrogen. The residual value, after one crop has been removed, is taken as one-half of the original residual value. Residual values, after one crop has been removed, are reduced by one-half after each crop.

FOODS.	VALUE PER					
	Digested Nitrogen.			Undigested Nitrogen.		
	Per cent in food. (1)	Value at 7s. per unit. (2)	Two-fifths value to manure. (3)*	Per cent in food. (4)	* Value at 5s. per unit. (5)	Three-fourths value to manure. (6)
		s. d.	s. d.		s. d.	s. d.
Cotton-cake, decorticated	5·92	41 5	16 7	0·98	4 11	3 8
Cotton-cake, undecorticated	2·73	19 1	7 8	0·81	4 1	3 1
Linseed-cake	4·08	28 7	11 5	0·67	3 4	2 6
Linseed	3·28	23 0	9 2	0·32	1 7	1 2
Soya-bean cake	6·10	42 8	17 1	0·75	3 9	2 10
Palm-nut cake	1·88	13 2	5 3	0·62	3 1	2 4
Cocoa-nut cake	2·65	18 7	7 5	0·75	3 9	2 10
Earth-nut cake	6·86	48 0	19 2	0·76	3 10	2 11
Rape cake	3·97	27 9	11 1	0·93	4 8	3 6
Beans	3·48	24 4	9 9	0·52	2 7	1 11
Peas	3·10	21 8	8 8	0·50	2 6	1 11
Wheat	1·49	10 5	4 2	0·31	1 7	1 2
Barley	1·16	8 1	3 3	0·49	2 5	1 10
Oats	1·52	10 8	4 3	0·48	2 5	1 10
Maize	1·22	8 6	3 5	0·48	2 5	1 10
Rice-meal	1·08	7 7	3 0	0·82	4 1	3 1
Locust beans	0·82	5 9	2 4	0·38	1 11	1 5
Malt	1·34	9 5	3 9	0·36	1 10	1 5
Malt culms	3·12	21 10	8 9	0·78	3 11	2 11
Bran	1·98	13 10	5 6	0·52	2 7	1 11
Brewers' and distillers' grains (dried)	2·34	16 5	6 7	0·96	4 10	3 8
Brewers' and distillers' grains (wet)	0·59	4 2	1 8	0·22	1 1	0 10
Dried distillery dreg	3·45	24 2	9 8	1·86	9 4	7 0
Clover hay	1·21	8 6	3 5	1·03	5 2	3 11
Meadow hay	0·88	6 2	2 6	0·62	3 1	2 4
Wheat straw	0·02	0 2	0 1	0·43	2 2	1 8
Barley straw	0·10	0 8	0 3	0·30	1 6	1 2
Oat straw	0·17	1 2	0 6	0·33	1 8	1 3
Mangolds	0·15	1 1	0 5	0·07	0 4	0 3
Swedes	0·16	1 1	0 5	0·09	0 5	0 4
Turnips	0·13	0 11	0 4	0·05	0 3	0 2
Fish-meal	8·08	56 7	22 8	0·90	4 6	3 5

* See last paragraph of explanatory note to the Table.

A.

TON AS MANURE.

B.

COMPENSATION VALUE PER TON OF FOOD CONSUMED.

Phosphoric Acid.			Potash.			† (1) Value recovered in dung.	‡ (2) Value of lasting part of dung.	Residual Value after		
Per cent in food (7)	Value at 3s. 9d. per unit. (8)	Three-fourths value to manure. (9)	Per cent in food. (10)	Value at 4s. 3d. per unit. (11)	Three-fourths value to manure. (12)	(13) *	(14)	* (3) One crop. (15)	* (4) Two crops. (16)	* (5) Three crops. (17)
	s. d.	s. d.		s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
3·10	11 8	8 9	2·00	8 6	6 5	35 5	18 10	9 5	4 9	2 4
2·00	7 6	5 8	2·00	8 6	6 5	22 10	15 2	7 7	3 10	1 11
2·00	7 6	5 8	1·40	5 11	4 5	24 0	12 7	6 4	3 2	1 7
1·54	5 9	4 4	1·37	5 10	4 5	19 1	9 11	5 0	2 6	1 3
1·30	4 11	3 8	2·20	9 4	7 0	30 7	13 6	6 9	3 5	1 8
1·20	4 6	3 5	0·50	2 2	1 8	12 8	7 5	3 9	1 10	0 11
1·40	5 3	3 11	2·00	8 6	6 5	20 7	13 2	6 7	3 4	1 8
2·00	7 6	5 8	1·50	6 5	4 10	32 7	13 5	6 9	3 4	1 8
2·50	9 5	7 1	1·50	6 5	4 10	26 6	15 5	7 9	3 10	1 11
1·10	4 2	3 2	1·30	5 6	4 2	19 0	9 3	4 8	2 4	1 2
0·85	3 2	2 5	0·96	4 1	3 1	16 1	7 5	3 9	1 10	0 11
0·85	3 2	2 5	0·53	2 3	1 8	9 5	5 3	2 8	1 4	0 8
0·75	2 10	2 2	0·55	2 4	1 9	9 0	5 9	2 11	1 5	0 9
0·60	2 3	1 8	0·50	2 2	1 8	9 5	5 2	2 7	1 4	0 8
0·60	2 3	1 8	0·37	1 7	1 2	8 1	4 8	2 4	1 2	0 7
0·60	2 3	1 8	0·37	1 7	1 2	8 11	5 11	3 0	1 6	0 9
0·80	3 0	2 3	0·80	3 5	2 7	8 7	6 3	3 2	1 7	0 9
0·80	3 0	2 3	0·60	2 7	1 11	9 4	5 7	2 10	1 5	0 8
2·00	7 6	5 8	2·00	8 6	6 5	23 9	15 0	7 6	3 9	1 11
2·70	10 2	7 8	1·45	6 2	4 8	19 9	14 3	7 2	3 7	1 9
1·61	6 0	4 6	0·20	0 10	0 8	15 5	8 10	4 5	2 3	1 1
0·42	1 7	1 2	0·05	0 3	0 2	3 10	2 2	1 1	0 7	0 3
0·44	1 8	1 3	0·22	0 11	0 8	18 7	8 11	4 6	2 3	1 1
0·57	2 2	1 8	1·50	6 5	4 10	13 10	10 5	5 3	2 7	1 4
0·40	1 6	1 2	1·60	6 10	5 2	11 2	8 8	4 4	2 2	1 1
0·24	0 11	0 8	0·80	3 5	2 7	5 0	4 11	2 6	1 3	0 7
0·18	0 8	0 6	1·00	4 3	3 2	5 1	4 10	2 5	1 3	0 7
0·24	0 11	0 8	1·00	4 3	3 2	5 7	5 1	2 7	1 3	0 8
0·07	0 3	0 2	0·40	1 8	1 3	2 1	1 8	0 10	0 5	0 3
0·06	0 3	0 2	0·22	0 11	0 8	1 7	1 2	0 7	0 4	0 2
0·05	0 2	0 2	0·30	1 3	0 11	1 7	1 3	0 8	0 4	0 2
7·24	27 2	20 5	0·50	2 2	1 8	48 2	25 6	12 9	6 5	3 2

† The figures in column (13) are the sum of columns (3), (6), (9), and (12).

‡ The figures in column (14) are the figures in column (13) from which the corresponding figures in column (3) have been subtracted.

BOTANICAL DEPARTMENT

Consulting Botanist to the Society—(vacant).

The Society has fixed the following scale of charges for the examination of plants and seeds for the *bona fide* and individual use and information of members of the Society (not being seedsmen), who are particularly requested, when applying to the Consulting Botanist, to mention the kind of examination required, and to quote its number as appearing in the undernoted Scale of Charges. The charge for examination must be paid at the time of application, and the carriage or postage on all parcels must be prepaid.

Scale of Charges for Examinations.

1. A report on the purity, amount, and nature of foreign materials, and the germinating power of a sample of seed . . 1s.
2. Determination of the species of any weed or other plant, or of any vegetable parasite, with a report on its habits and the means for its extermination or prevention . . . 1s.
3. Report on any disease affecting farm crops . . . 1s.
4. Determination of the species of any natural grass or fodder plant, with a report on its habits and pasture or feeding value . . . . 1s.

The Consulting Botanist's Reports are furnished to enable members —purchasers of seeds and corn for agricultural or horticultural purposes—to test the value of what they buy, and are not to be used or made available for advertising or trade purposes by seedsmen or otherwise.

Purchase of Seeds.

The purchaser should obtain from the vendor, by invoice or other writing, the proper designation of the seed bought, with a guarantee of the percentage of purity and germination, and of its freedom from ergot, and in the case of clover, from the seeds of dodder or broom-rape.

It is strongly recommended that the purchase of *prepared mixtures* of seeds should be avoided. The different seeds should be purchased separately and mixed by the farmer: mixtures cannot be tested for germination.

The Sampling of Seeds.

The utmost care should be taken to secure a fair and honest sample. This should be drawn from the bulk delivered to the purchaser, and not from the sample sent by the vendor.

When legal evidence is required, the sample should be taken from the bulk, and placed in a sealed bag in the presence of a witness. Care should be taken that the sample and bulk be not tampered with after delivery, or mixed or brought in contact with any other sample or bulk.

At least one ounce of grass and other small seeds should be sent, and two ounces of cereals and the larger seeds. When the bulk is obviously impure the sample should be at least double the amount specified. Grass seeds should be sent at least four weeks, and seeds of clover and cereals two weeks, before they are to be used.

The exact name under which the sample has been sold and purchased should accompany it.

Reporting the Results.

The Report will be made on a schedule in which the nature and amount of impurities will be stated, and the number of days each sample has been under test, with the percentage of the seeds which have germinated.

"Hard" clover seeds, though not germinating within the time stated, will be considered good seeds, and their percentage separately stated.

The impurities in the sample, including the chaff of the species tested, will be specified in the schedule, and only the percentage of the pure seed of that species will be reported upon; but the REAL VALUE of the sample will be stated. The Real Value is the combined percentages of purity and germination, and is obtained by multiplying these percentages and dividing by 100: thus in a sample of Meadow Fescue having 88 per cent purity and 95 per cent germination, 88 multiplied by 95 gives 8360, and this divided by 100 gives 83·6, the Real Value.

Selecting Specimens of Plants.

The whole plant should be taken up and the earth shaken from the roots. If possible the plants must be in flower or fruit. They should be packed in a light box, or in a firm paper parcel.

Specimens of diseased plants or of parasites should be forwarded as fresh as possible. They should be placed in a bottle, or packed in tinfoil or oil-silk.

All specimens should be accompanied with a letter specifying the nature of the information required, and stating any local circumstances (soil, situation, &c.) which, in the opinion of the sender, would be likely to throw light on the inquiry.

NOTE.—Members are reminded that Seeds may now be tested at the Department of Agriculture for Scotland Seed-Testing Station. Samples should be addressed to T. Anderson, Esq., Seed-testing Station, East Craigs, Corstorphine, Midlothian.

ENTOMOLOGICAL DEPARTMENT

Consulting Entomologist to the Society—R. STEWART MACDOUGALL, M.A., D.Sc., LL.D., Ivy Lodge, Gullane.

Arrangements have been made with Dr MacDougall to advise members of the Society regarding insects or allied animals which, in any stage of their development, infest—

(*a*) Farm crops.
(*b*) Stored grain.
(*c*) Garden and greenhouse plants.
(*d*) Fruit and fruit trees.
(*e*) Forest trees and stored timber.
(*f*) Live stock (including poultry).

Members consulting Dr MacDougall should forward with their queries specimens of the injured plants, or the injured parts of plants, &c., as well as specimens of the insects or other animals believed to be the cause of the injury.

Specimens should be sent in tin or wooden boxes, or in quills, to prevent injury in transmission.

Letters and parcels (carriage or postage paid) should be addressed to R. Stewart MacDougall, Esq., M.A., D.Sc., LL.D., Ivy Lodge, Gullane.

The Directors have fixed the fee payable by members to Dr MacDougall at 1s. for each case upon which he is consulted: this fee should be sent to him along with the application for information.

PREMIUMS OFFERED

1934

GROUP 1.—REPORTS.

GENERAL REGULATIONS.

1. It is to be distinctly understood that the Society is not responsible for the views, statements, or opinions of any of the writers whose papers are published in the 'Transactions.'

2. All reports must be legibly written, and on one side of the paper only; they must specify the number and subject of the Premium for which they are in competition; they must bear a distinguishing motto, and be accompanied by a sealed letter, similarly marked, containing the name and address of the reporter—initials must not be used.

3. No sealed letter, unless belonging to a report found entitled to the Premium offered, or a portion of it, will be opened without the author's consent.

4. Reports for which a Premium, or a portion of a Premium, has been awarded, become the property of the Society, and cannot be published in whole or in part, or circulated in any manner, without the consent of the Directors. All other papers will be returned to the authors if applied for within twelve months.

5. The Society is not bound to award the whole or any part of a Premium.

6. All reports must be of a practical character, containing the results of the writer's own observation or experiment, and the special conditions attached to each Premium must be strictly fulfilled. General essays, and papers compiled from books, will not be rewarded or accepted. Weights and measurements must be indicated by the imperial standards.

7. The Directors, before or after awarding a Premium, shall have power to require the writer of any report to verify the statements made in it.

8. The decisions of the Board of Directors are final and conclusive as to all matters relating to Premiums, whether for Reports or at General or District Shows; and it shall not be competent to raise any question or appeal touching such decisions before any other tribunal.

9. The Directors will welcome papers from any Contributor on any suitable subject, whether included in the Premium List or not; and if the topic and the treatment of it are both approved, the writer may be remunerated and his paper published.

SECTION 1.—THE SCIENCE AND PRACTICE OF AGRICULTURE.

FOR APPROVED REPORTS.

1. On any useful practice in Rural Economy adopted in other countries, and susceptible of being introduced with advantage into Scotland—The Gold Medal. To be lodged by 1st November in any year.

The purpose chiefly contemplated by the offer of this premium is to induce travellers to notice and record such particular practices as may seem calculated to benefit Scotland. The Report to be founded on personal observation.

2. Approved Reports on other suitable subjects. To be lodged by 1st November in any year.

SECTION 2.—ESTATE IMPROVEMENTS.

FOR APPROVED REPORTS.

1. By the Proprietor in Scotland who shall have executed the most judicious, successful, and extensive Improvement—The Gold Medal, or Ten Pounds. To be lodged by 1st November in any year.

Should the successful Report be written for the Proprietor by his resident factor or farm manager, a Minor Gold Medal will be awarded to the writer in addition to the Gold Medal to the Proprietor.

The merits of the Report will not be determined so much by the mere extent of the improvements, as by their character and relation to the size of the property. The improvements may comprise reclaiming, draining, enclosing, planting, road-making, building, and all other operations proper to landed estates. The period within which the operations may have been conducted is not limited, except that it must not exceed the term of the Reporter's proprietorship.

2. By the Proprietor or Tenant in Scotland who shall have reclaimed within the ten preceding years not less than forty

acres of Waste Land—The Gold Medal, or Ten Pounds. To be lodged by 1st November in any year.

3. By the Tenant in Scotland who shall have reclaimed within the ten preceding years not less than twenty acres of Waste Land—The Gold Medal, or Ten Pounds. To be lodged by 1st November in any year.

4. By the Tenant in Scotland who shall have reclaimed not less than ten acres within a similar period—The Medium Gold Medal, or Five Pounds. To be lodged by 1st November in any year.

The Reports in competition for Nos. 2, 3, and 4 may comprehend such general observations on the improvement of waste lands as the writer's experience may lead him to make, but must refer especially to the lands reclaimed—to the nature of the soil—the previous state and probable value of the subject—the obstacles opposed to its improvement—the details of the various operations—the mode of cultivation adopted—and the produce and value of the crops produced. As the required extent cannot be made up of different patches of land, the improvement must have relation to one subject; it must be of profitable character, and a rotation of crops must have been concluded before the date of the Report. *A detailed statement of the expenditure and return* and a certified measurement of the ground are requisite.

5. By the Proprietor or Tenant in Scotland who shall have improved within the ten preceding years the Pasturage of not less than thirty acres, by means of top-dressing, draining, or otherwise, without tillage, in situations where tillage may be inexpedient—The Gold Medal, or Ten Pounds. To be lodged by 1st November in any year.

6. By the Tenant in Scotland who shall have improved not less than ten acres within a similar period—The Minor Gold Medal. To be lodged by 1st November in any year.

Reports in competition for Nos. 5 and 6 must state the particular mode of management adopted, the substances applied, the elevation and nature of the soil, its previous natural products, and the changes produced.

SECTION 3.—HIGHLAND INDUSTRIES.

FOR APPROVED REPORTS.

1. The best mode of treating native Wool; cleaning, carding, dyeing, spinning, knitting, and weaving by hand in the Highlands and Islands of Scotland—Five Pounds. To be lodged by 1st November in any year.

SECTION 4.—MACHINERY.

FOR APPROVED REPORTS.

To be lodged by 1st November in any year.

SECTION 5.—FORESTRY.

FOR APPROVED REPORTS.

1. On Plantations of not less than eight years' standing formed on deep peat-bog—The Medium Gold Medal, or Five Pounds. To be lodged by 1st November in any year.

The premium is strictly applicable to deep peat or flow moss; the condition of the moss previous to planting, as well as at the date of the Report, should, if possible, be stated.

The Report must describe the mode and extent of the drainage, and the effect it has had in subsiding the moss—the trenching, levelling, or other preliminary operations that may have been performed on the surface—the mode of planting—kinds, sizes, and number of trees planted per acre—and their relative progress and value, as compared with plantations of a similar age and description grown on other soils in the vicinity.

GROUP II.—DISTRICT GRANTS.

APPLICATIONS.

Forms of Application may be obtained from the Secretary, 8 Eglinton Crescent, Edinburgh 12, which should be completed and returned on or before **1st November 1934,** in respect of a Grant commencing in the following year.

Renewal of Grant.—Applications for **renewal** of a particular Grant will be entertained only after the lapse of a specified interval of years (as undernoted) from the termination of the previous Grant, without prejudice, however, to the competency of applying in such intermediate years for a Grant in any other class.

Class.		Interval.
1.	Show Grant of £12 for Horses, Cattle, Sheep, and Pigs	4 years.
2.	Stallion Grant of £15	4 years.
3.	Two Silver Medals in aid of Premiums . . .	2 years.
4.	Special Grants	—
5.	Grant of £10 to Federations of S.W.R.I. . . .	2 years.

1. GRANTS TO LOCAL SOCIETIES FOR HORSES, CATTLE, SHEEP, AND PIGS.

Regulations, 1934.

1. Class of Stock—Limit of Grants, £340.—The Highland and Agricultural Society will make Grants to Local Societies for prizes for *Breeding Animals* in any of the following Classes of Stock, viz.:—

Cattle.

Shorthorn.
Aberdeen-Angus.
Galloway.
Belted Galloway.
Highland.
Ayrshire.
British Friesian.
Red Poll.
Jersey.
Shetland.

Pigs.

Any Pure Breed.

Horses.

Draught Horses.
Hunters.
Hackneys.
Ponies.
Shetland Ponies.

Sheep.

Blackface.
Cheviot.
Border Leicester.
Half-Bred.
Shropshire.
Oxford Down.
Suffolk.
Wensleydale.

Cross-bred [1] animals are not eligible. The Prizes must be confined to *Breeding* Animals; "bullocks," "geldings," "wethers," and "hog pigs" are excluded.

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[1] *Exceptions to this rule may, however, be authorised by the Board of Directors, on application. The Directors are prepared to consider applications from local Societies which desire to use their grants, or part thereof, as prizes for cross-bred calves and one-year-old cross-bred cattle.*

2. All Competitions must be at the instance of a Local Society. A Committee of Management shall be appointed, and either the Convener of the Committee or the Secretary of the Society **must be a Member of the Highland and Agricultural Society of Scotland.**

3. Grant to Society, £12.—The portion of the Grant to any one Local Society shall not exceed the sum of £12 in any one year.

4. Allocation of Grant.—The Grant from the Highland and Agricultural Society shall not be applied as a Grant in aid of the Premiums offered by the Local Society, but must be offered in the form of separate Prizes for the Animals chosen; **and the offer of the Prizes must be announced in the Premium List and Catalogue of the Show as "presented by the Highland and Agricultural Society of Scotland."**

5. Continuance of Grant—Three Years.—The Money Grant shall continue for three alternate years, provided always that the Local Society shall, in the two intermediate years, continue the competition by offering Premiums for the same class of Stock as that selected in each previous year to compete for the Highland and Agricultural Society's Prizes.

If no competition takes place for two consecutive years the Grant expires.

6. Medals in Intermediate Years.—In the two intermediate years the Highland and Agricultural Society will place three Silver Medals at the disposal of each Local Society, for the same classes of Stock as those for which the Money Premiums are offered, provided that not less than three lots are exhibited in the same class.

7. When it is agreed to hold the General Show of the Society in any one of the Show Divisions, no provincial Show may be held in that district in the **three months immediately preceding** the date of the General Show. **In the event of a Show being held, the entire grant to the Society will be cancelled.**

8. Rules of Competition.—The Rules of Competition for the Premiums, the funds for which are derived from Grants of the Highland and Agricultural Society, shall be such as are generally enforced by the Society receiving the Grant for Premiums offered by itself.

9. Area and Parishes—Five Parishes.—When making application for Grants from the Highland and Agricultural Society, the Local Society must delineate the area and the number of parishes comprised in the district, and, *except in special cases*, no Local Society shall be entitled to a Grant whose show is not open to at least *five* Parishes.

10. Reports. — Forms of Report will be furnished to the Secretaries of Local Societies. Both in the years when the Grant is offered and in the **two intermediate years,** detailed reports of the competition must be given on these Forms and lodged with the Secretary of the Highland and Agricultural Society as soon as possible after the Show, and in no case later than **1st November.** These reports are subject to the approval of the Directors of the Highland and Agricultural Society, against whose decision there shall be no appeal. All Reports must be signed and certified as marked on the Form. The Grant will lapse if no Report is lodged.

11. Grants—When Paid.—The Grants made to Local Societies will be paid in December after the Reports of the awards of the prizes have been received and found to be in order and passed by

the Board of Directors, the Money Grants being paid to the Secretaries of the Local Societies and the Medals sent direct to the winners. *The Secretary of the Local Society must not on any condition whatever pay any premium offered by the Highland and Agricultural Society until he has been informed that the awards are in order and has received the Grant from the Highland and Agricultural Society.*

12. RENEWAL OF GRANT.—No application for renewal of a Money Grant to a Local Society will be entertained until the expiration of *four years* from the termination of the last Grant.

13. DISPOSAL OF APPLICATIONS.—In disposing of applications for District Grants, the Directors of the Highland and Agricultural Society shall keep in view the length of interval that has elapsed since the expiration of the last Grant, giving priority to those Local Societies which have been longest off the list.

Grants in 1934.

5th and Final Year—GRANT OF £12.

1. ANNAN AND DISTRICT AGRICULTURAL SOCIETY.
Convener—John Roddick of Greenbank, Annan.
Secretary—James Risk, Kinmount Estate Office, Annan.
Granted 1928. (Grants in abeyance 1930, on account of Dumfries Show ; in 1931—Show abandoned on account of Foot-and-Mouth Disease Order.)

2. LOCKERBIE AGRICULTURAL SOCIETY.
Convener—R. Jardine Paterson of Balgray, Lockerbie.
Secretary—Thomas Henderson, Solicitor, Lockerbie.
Granted 1929. (Grant in abeyance 1930, on account of Dumfries Show.)

3. KENNETHMONT AGRICULTURAL ASSOCIATION.
Convener—Charles E. N. Leith-Hay of Leith Hall, Kennethmont.
Secretary—John M. Reid, Ardlair Farm, Kennethmont.
Granted 1930.

4. MAR AGRICULTURAL ASSOCIATION.
Convener—Colonel J. Barclay Milne, of Kinaldie, Kinaldie.
Secretaries and Treasurers—W. S. and P. Morrison, Black Chambers, Kinellar.
Granted 1930.

5. UPPER DEESIDE AGRICULTURAL ASSOCIATION.
Convener—Robert Carr, Balnacraig, Banchory.
Secretary—George J. Wilson, The Bank House, Torphins.
Granted 1930.

*6. MID-ARGYLL AGRICULTURAL SOCIETY.
Convener—Peter Macarthur, Auchnabreck, by Lochgilphead.
Secretary—Neil L. M'Vicar, Ri-Cruin, Kilmartin, Argyll.
Granted 1930.

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* *The Show of this Society falls to be held within the area comprising the Glasgow Show Division. Under Regulation 7, should this Society hold its Show within the three months* immediately preceding *the date of the "Highland" Show at Glasgow (19th-22nd June 1934), the entire Grant to the Society will be cancelled.*

7. DUNBARTONSHIRE AGRICULTURAL SOCIETY.
Chairman—Peter Robertson, Dalmuir Farm, Dalmuir.
Secretary—George Lawrence, Union Bank of Scotland Ltd., Dumbarton.
Granted 1930.

*8. CARNWATH AGRICULTURAL SOCIETY.
Convener—Andrew S. Lawson, Guildhouse, Forth.
Secretary and Treasurer—A. M. White, Commercial Bank of Scotland Ltd., Carnwath.
Granted 1930.

9. SPEY, AVEN AND FIDDICHSIDE FARMER CLUB.
Convener—William Fraser, Cardow, Knockando.
Secretary—R. Dick Stuart, Seafield Square, Rothes.
Granted 1930.

4th (Intermediate) Year—3 SILVER MEDALS.

10. DALKEITH AGRICULTURAL SOCIETY.
Convener—William Allison, Campend, Dalkeith.
Secretary—William Carnegie, Auction Mart, Dalkeith.
Granted 1930. (Grant in abeyance 1931, on account of Hundredth Show, Edinburgh.)

11. BUCHLYVIE AND GARTMORE AGRICULTURAL ASSOCIATION.
Convener—James Stewart, Cashley, Buchlyvie.
Secretary—D. J. Muirhead, Wester Arngibbon, by Kippen.
Granted 1930. (Grant in abeyance 1931—Show abandoned on account of Foot-and-Mouth Disease Order.)

12 GARGUNNOCK FARMERS' CLUB.
Convener—John Risk, Culmore, Kippen Station.
Secretary—James Risk, Culmore, Kippen Station.
Granted 1930. (Grant in abeyance 1931.)

13. UPPER DONSIDE AGRICULTURAL SOCIETY.
Convener—Alexander Robertson, Upper Towie, Glenkindie.
Secretary—Alexander Kellas, Hillockhead, Cushnie, Alford.
Granted 1931.

14. SOUTH UIST AND BENBECULA CATTLE SHOW SOCIETY.
Convener—Dr Bartlett, Castlebay, Isle of Barra.
Secretary—John MacLeod, Bualnachrach, Eochar, South Uist.
Granted 1931.

15. DUNBLANE AGRICULTURAL SOCIETY.
Chairman—A. H. Anderson, Firs, Dunblane.
Secretary and Treasurer—John Stewart, Solicitor, Dunblane.
Granted 1931.

16. BORDER UNION AGRICULTURAL SOCIETY.
Convener—W. H. Thomson, Over Roxburgh, Roxburgh.
Secretary—J. S. Roberton, Yetholm Mains, Kelso.
Granted 1931.

* See footnote on p. 67.

3rd (Alternate) Year—GRANT OF £12.

17. Latheron Landholders' Show Society.
Convener—John Gunn, Jun., Lybster Mains, Lybster, Caithness.
Secretary—David Sutherland, Shantry, Latheron, Caithness.
Granted 1931. (Grant in abeyance 1933.)

18. Lammermoor Pastoral Society.
Convener—Walter Elliot, Harehead, Duns.
Hon. Secretary and Treasurer—Thomas Stephenson, Duns.
Granted 1931. (Grant in abeyance 1931.)

19. Kinglassie Agricultural Society.
Convener—William Meiklem, Bennochy Park, Kirkcaldy.
Secretary and Treasurer—D. Mackenzie, Commercial Bank of Scotland Ltd., Thornton, Fife.
Granted 1931. (Grant in abeyance 1931—Show abandoned on account of Foot-and-Mouth Disease Order.)

20. Eskdale and Liddesdale Agricultural and Pastoral Society.
Convener—Andrew Douglas, Jun., Saughtree, Newcastleton.
Secretary—James Fairful, 56A Henry Street, Langholm.
Granted 1932.

21. Nithsdale Agricultural Society.
Convener—Charles W. Ralston, Dabton, Thornhill, Dumfriesshire.
Secretary—W. M. Henderson, Solicitor, Thornhill, Dumfriesshire.
Granted 1932.

22. Skye Agricultural Society.
Convener—Alexander MacCallum, Scorrybreck, Portree, Isle of Skye.
Secretary—Malcolm MacAulay, Department of Agriculture for Scotland, Estates Office, Portree, Isle of Skye.
Granted 1932.

23. Kincardineshire Farmers' Club.
Convener—Alexander Anderson, Burnton, Laurencekirk.
Secretary—James B. Connon, Solicitor, Stonehaven.
Granted 1932.

*24. Strathaven and District Agricultural Exposition.
Convener—Peter Meikle, M.R.C.V.S., Avonholme, Strathaven.
Secretary—Alexander O. Jennings, Welland Villa, Strathaven.
Granted 1932.

25. Morayshire Farmer Club.
Convener—Captain Ian S. Robertson, Linkwood, Elgin.
Secretary—W. Rose Black, Solicitor, Elgin.
Granted 1932.

26. West Linton Agricultural Society.
Convener—Captain R. J. Thomson of Kaimes, West Linton.
Secretary—William Forbes, Bank Chambers, West Linton.
Granted 1932.

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* See footnote on p. 67.

27. DOUNE AGRICULTURAL ASSOCIATION.
Convener—R. W. Fairweather, Park House, Blair-Drummond.
Secretary—A. Mitchell Holmes, Deanston Farm, Doune.
Granted 1932.

28. WIGTOWN AGRICULTURAL SOCIETY.
Convener—William Christison, Barglass, Kirkinner.
Secretary—Gavin Coupland, Wigtown.
Granted 1932.

2nd (Intermediate) Year—3 SILVER MEDALS.

29. SANQUHAR FARMERS' SOCIETY.
Convener—James Hunter, Carco, Sanquhar.
Secretary—W. M. Henderson, Solicitor, Sanquhar.
Granted 1932. (Grant in abeyance 1933—no Show held.)

*30. TIREE AGRICULTURAL SHOW SOCIETY.
Convener—Malcolm M'Lean, Kirkapol, Tiree.
Secretary—William G. Macdiarmid, Island House, Tiree.
Granted 1932. (Grant in abeyance 1932—no Show held.)

31. BUCHAN AGRICULTURAL SOCIETY.
President—James C. Booth, Downiehill, Peterhead.
Secretary—Robert Scott, 1 Narrow Lane, Peterhead.
Granted 1933.

32. VALE OF ALFORD AGRICULTURAL ASSOCIATION.
Convener—Lord Forbes, Castle Forbes, Whitehouse, Aberdeenshire.
Secretary—Robert S. Law, New Keig, Keig, Aberdeen.
Granted 1933.

*33. LARGS, CUMBRAE AND WEMYSS BAY AGRICULTURAL SOCIETY.
Convener—John S. Wilson, 21 Crawfurd Street, Greenock.
Secretary—Alexander Grant, Crawfordlea, Brisbane Road, Largs.
Granted 1933.

34. CENTRAL BANFFSHIRE FARMERS' CLUB.
Convener—George Grant, Glenfarclas, Blacksboat.
Secretary—John C. Gray, 65 Moss Street, Keith.
Granted 1933.

35. DUMFRIES AGRICULTURAL SOCIETY.
Convener—James A. Ferguson, Burrance of Courance, Lockerbie.
Secretary—David Fergusson, 75 Buccleuch Street, Dumfries.
Granted 1933.

36. WESTERN DISTRICT OF FIFE AGRICULTURAL SOCIETY.
Convener—Major W. B. Robertson, M.C., of Colton, Dunfermline.
Secretary—W. Craig Husband, Union Bank Chambers, Dunfermline.
Granted 1933.

See footnote on p. 67.

37. KIRKPATRICK-DURHAM HORTICULTURAL AND AGRICULTURAL SOCIETY.
Convener—James Carson, Barwhillanty, Parton, Castle Douglas.
Secretary—J. A. Peacock, Kirkpatrick-Durham, Dalbeattie.
Granted 1933.

*38. SHOTTS CALDERWATERHEAD FARMERS' SOCIETY.
Convener—William Moffat, East Tarbrax, Shotts.
Secretary—Thomas Sommerville, 47 Bon Accord Crescent, Shotts.
Granted 1933.

39. STRATHORD AGRICULTURAL SOCIETY.
Convener—Douglas Butter, Shielhill, Stanley.
Secretary—A. J. Bisset, Ellonbank, Bankfoot.
Granted 1933.

40. WHITBURN AGRICULTURAL SOCIETY.
Convener—James G. Sibbald, Hardhill Farm, Bathgate.
Secretary—P. A. Simpson, Commercial Bank of Scotland Ltd., Whitburn, West Lothian.
Granted 1933.

1st (Alternate) Year—Grant of £12.

41. NORTHERN COUNTIES AGRICULTURAL SOCIETY.
Convener—K. P. MacGillivray, Kirkton, Bunchrew.
Assistant Secretary—W. A. Hardie, M.A., LL.B., 2 Inglis Street, Inverness.
Granted 1934.

42. STEWARTRY AGRICULTURAL SHOW.

Promoted by the St Mary's Isle Agricultural Society, the Dalbeattie Agricultural Society and the Gatehouse District Agricultural Society.

Convener—H. C. Howard Taylor, Park House, Kirkcudbright.
Secretaries—Gibson & Montgomery, Solicitors, Kirkcudbright.
Granted 1934.

43. DEESIDE AGRICULTURAL ASSOCIATION.
Convener—William H. Hector, Upper Anguston, Peterculter.
Secretary—David Humble, Dowalty, Crathes.
Granted 1934.

44. GARIOCH FARMER CLUB.
Convener—R. Laidlaw Smith, Pittodrie, Pitcaple, Aberdeenshire.
Secretary—Alexander Watt, Cairnhill, Rothney, Insch.
Granted 1934.

45. ROSSIE PRIORY AND DISTRICT AGRICULTURAL SOCIETY.
Convener—William G. Walker, Millhill, Inchture, Perthshire.
Secretary—David M. Johnston, 71 High Street, Dundee.
Granted 1934.

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* See footnote on p. 67.

46. East of Fife Agricultural Society.
Convener—Gilbert R. M'Garva, Balcarres Estate Office, Colinsburgh.
Secretary—D. H. M'Lachlan, Commercial Bank of Scotland Ltd., Colinsburgh.
Granted 1934.

47. North Uist Agricultural Society.
Convener—Dr M. T. Mackenzie, Scolpaig, Lochmaddy.
Secretary—Peter Morrison, J.P., Sollas, Lochmaddy.
Granted 1934.

2. GRANTS TO HORSE ASSOCIATIONS, &c., FOR STALLIONS FOR AGRICULTURAL PURPOSES.

Regulations, 1934.

1. The Highland and Agricultural Society will make Grants to Horse Associations and other Societies in different districts engaging Stallions for agricultural purposes. The total sum expended by the Highland and Agricultural Society in such Grants shall not exceed the sum of £210 in any one year.

2. The portion of the Grant to any one Association or Society shall not exceed the sum of £15 in any one year. The Grant shall be used as a Premium, or part of a Premium, to be paid by the Association to the owner of the Stallion engaged.

3. The Grant will be available only for Stallions which, for the year to which the Grant applies, are registered in the Register of Certified Draught Stallions published by the Department of Agriculture for Scotland. (For information regarding the Registration of Stallions, apply to the Secretary of the Department of Agriculture for Scotland, York Buildings, Queen Street, Edinburgh.)

4. The Grant will continue for three years provided the Association receiving the Grant shall hire a Registered Stallion in the two intermediate years.

5. In the event of a Horse not being engaged in any one year while the provisions of the Grant are in force, the Grant made by the Highland and Agricultural Society will cease.

6. Rules 2 (Committee and Convener), 10 (Reports), 11 (Time of Payment), 12 (Renewal of Grant), and 13 (Disposal of Applications) applicable to Section 1, shall be applicable to this Section.

Grants in 1934.

5th and Final Year—GRANT OF £15.

1. Mid-Argyll Agricultural Society.
Convener—J. G. Mathieson, Ri-Cruin, Kilmartin, Argyll.
Secretary—Neil L. M'Vicar, Ri-Cruin, Kilmartin, Argyll.
Granted 1930.

2. Upperward of Lanarkshire Agricultural Association.
Convener—Richard Findlater, Jerviswood Mains, Lanark.
Secretary—R. R. Black, Royal Bank of Scotland, Lanark.
Granted 1930.

3. SPEY, AVEN AND FIDDICHSIDE FARMER CLUB.
Convener—William Fraser, Cardow, Knockando.
Secretary—R. Dick Stuart, Seafield Square, Rothes.
Granted 1930.

4. STIRLING DISTRICT CLYDESDALE HORSE SOCIETY.
Convener—James More, Woodyet, Gargunnock.
Secretary— ……………………………………………
Granted 1930.

4th (Intermediate) Year—Grant in Abeyance

5. MORAYSHIRE CLYDESDALE HORSE-BREEDING ASSOCIATION.
Convener—John Robertson, Inverlochty, Elgin.
Secretary—William Thomson, 149 High Street, Elgin.
Granted 1930. (Grant in abeyance 1930—postponed.)

6. ISLAY SMALL LANDHOLDERS' SOCIETY.
Convener—John G. Morrison of Islay, Islay House, Islay.
Secretary—Iain M. Mactaggart, Bowmore, Islay.
Granted 1931.

7. DEESIDE STOCK IMPROVEMENT SOCIETY.
Convener—John Thomson, J.P., Beanshill, Milltimber.
Secretary—Peter Ross, Barns of Durris, Crathes.
Granted 1931.

8. STONEHAVEN DISTRICT HORSE-BREEDING ASSOCIATION.
President—John Eddie, Hallhill, Kinneff, Inverbervie.
Secretary—James B. Connon, Solicitor, Stonehaven.
Granted 1931.

9. STRATHSPEY FARMERS' CLUB.
Convener—D. M. Allan, Ballintomb, Grantown-on-Spey.
Secretary—John G. MacDougall, Dunollie, Grantown-on-Spey.
Granted 1931.

10. SHAPANSAY AGRICULTURAL ASSOCIATION.
Convener—William T. Wood, Balfour Mains, Shapansay, Kirkwall, Orkney.
Secretary—D. L. Kemp, Bayview, Shapansay, Kirkwall, Orkney.
Granted 1931.

3rd (Alternate) Year—GRANT OF £15.

11. SANDAY AGRICULTURAL ASSOCIATION.
Convener—W. Cowper Ward, Scar House, Sanday, Orkney.
Secretary—John Wallace, Prattsfauld, Sanday, Orkney.
Granted 1931. (Grant in abeyance 1931—postponed.)

12. UPPER DONSIDE AGRICULTURAL SOCIETY.
Convener—Alexander Robertson, Upper Towie, Glenkindie.
Secretary—Alexander Kellas, Hillockhead, Cushnie, Alford.
Granted 1932.

13. UPPER NITHSDALE HORSE SOCIETY.
Convener—Charles W. Ralston, Dabton, Thornhill, Dumfriesshire.
Secretary—W. M. Henderson, Solicitor, Thornhill, Dumfriesshire.
Granted 1932.

14. WEST OF FIFE CLYDESDALE ENTIRE HORSE SOCIETY.
Convener—Robert Jeffrey, Drumfin, Torryburn.
Secretary—A. J. Auchterlonie, Leckerstone, Dunfermline.
Granted 1932.

15. HOWE O' THE MEARNS HORSE-BREEDING SOCIETY.
Convener—James Anderson, Pitcarry, Inverbervie.
Secretary—Alexander Anderson, Burnton, Laurencekirk.
Granted 1932.

16. KINROSS-SHIRE AGRICULTURAL SOCIETY.
President—William Tod of East Brackley, Kinross.
Hon. Secretary—J. A. Hopburn, M.R.C.V.S., Ardmohr, Milnathort.
Granted 1932.

17. MORAY STOCK IMPROVEMENT SOCIETY.
Convener—W. S. MacWilliam, Burnside of Dipple, Fochabers.
Secretary—W. Rose Black, Solicitor, Elgin.
Granted 1932.

18. SOUTH RONALDSHAY AND BURRAY HORSE-BREEDING AND STOCK IMPROVEMENT SOCIETY.
Convener—John Tomison, Halcro, South Ronaldshay, Orkney.
Secretary—George A. Ryrie, Hall of Herston, South Ronaldshay, Orkney.
Granted 1932.

2nd (Intermediate) Year—Grant in Abeyance.

19. TIREE AGRICULTURAL (HEAVY HORSE-BREEDING) SOCIETY.
Convener—William G. Macdiarmid, Island House, Tiree.
Secretary—Malcolm M'Lean, Kirkapol, Tiree.
Granted 1933.

20. CENTRAL BANFFSHIRE FARMERS' CLUB.
Convener—George Grant, Glenfarclas, Blacksboat.
Secretary—John C. Gray, 65 Moss Street, Keith.
Granted 1933.

21. CLACKMANNANSHIRE UNION AGRICULTURAL SOCIETY.
Convener—Robert M'Gee, Blackfaulds, Alloa.
Secretary—G. F. Piggott, Union Street, Alloa.
Granted 1933.

22. EAST OF FIFE ENTIRE HORSE SOCIETY.
Convener—John Gray, Bonnyton, Stravithie.
Secretary—James Gray, Stravithie Mains, Stravithie.
Granted 1933.

1st (Alternate) Year—GRANT OF £15.

23. VALE OF ALFORD AND ABERDEEN DISTRICT HORSE-BREEDING SOCIETY.
Convener—Colonel Harry Forbes, D.S.O., Montgarrie House, Alford.
Secretary—James Lawson, Baldyvin, Alford.
Granted 1934.

24. CAITHNESS HORSE-BREEDING SOCIETY.
Convener—George King, Langwell, Berriedale, Caithness.
Secretary—A. G. Doull, Lybster, Caithness.
Granted 1934.

3. MEDALS IN AID OF PREMIUMS GIVEN BY LOCAL SOCIETIES.

REGULATIONS, 1934.

The Society, being anxious to co-operate with local Societies, will give a limited number of Silver Medals annually to Societies, not on the list of Cattle, Horse, or Sheep Premiums, in addition to the Money Premiums awarded in the Districts, for—

1. Best Bull, Cow, or Heifer of any pure breed included in Section 1.
2. Best Stallion or Mare of any pure breed included in Section 1.
3. Best Tup or Pen of Ewes of any pure breed included in Section 1.
4. Best Boar, Sow, or Breeding Pig of any pure breed.
5. Best Pens of Poultry.
6. Best Sample of any variety of Wool.
7. Best Sample of any variety of Seeds.
8. Best managed Farm.
9. Best managed Green Crop.
10. Best managed Hay Crop.
11. Best managed Dairy.
12. Best Sweet-Milk Cheese.
13. Best Cured Butter.
14. Best Fresh Butter.
15. Best collection of Roots.
16. Best kept Fences.
17. Best Sheep-Shearer.
18. Most expert Hedge-Cutter.
19. Most expert Labourer at Draining.
20. Best Maker of Oatcakes.

It is left to the local Society to choose out of the foregoing list the classes for which the Medals are to be competed.

RULES OF COMPETITION.

1. All Competitions must be at the instance of a local Society.

2. The classes for which Medals are granted must be in accordance with the foregoing list. The Local Committee shall select the classes, and specify them in the Report.

3. The offer of the Medals must be announced in the Premium List and Catalogue of the Show as "presented by the Highland and Agricultural Society of Scotland."

4. The Medals are granted for two years, and lapse if not awarded in those years.

5. No Society shall receive more than two Medals in any year.

6. A Committee of Management shall be appointed, and either the Convener of the Committee or the Secretary of the Society **must be a member of the Highland and Agricultural Society of Scotland.**

7. When it is agreed to hold the General Show of the Society in any one of the Show Divisions, no provincial Show may be held in that district in the **three months** immediately **preceding** the date of the General Show. **In the event of a Show being held, the entire grant will be cancelled.**

8. The Money Premiums given in the District must be not less than £2 for each Medal claimed.

9. The Medal for Sheep-Shearing shall always accompany the highest Money Premium.

10. There must not be fewer than three competitors in all the classes.

11. Regarding Reports and despatch of Medals, Rules 10 and 11, Section 1, will apply.

12. When a grant of Medals has expired, the Society cannot apply again for Medals for two years.

Grants in 1934.

2nd Year.

1. ABERDOUR AND NORTH EASTERN AGRICULTURAL ASSOCIATION.
Convener—M. J. Keith, Aberdour House, Fraserburgh.
Secretary—John Mowat, Mains of Forest, Fraserburgh.
Granted 1933. (2 Medals.)

2. FYVIE HORTICULTURAL AND INDUSTRIAL ASSOCIATION.
Convener—George Morrison, Lawrence Cottage, Fyvie.
Secretary—Leonard Milne, Fyvie Station, Aberdeenshire.
Granted 1933. (2 Medals.)

3. EAST OF FIFE ENTIRE HORSE SOCIETY.
Convener—John Gray, Bonnyton, Stravithie.
Secretary—James Gray, Stravithie Mains, Stravithie.
Granted 1933. (2 Medals.)

4. SOUTH RONALDSHAY AND BURRAY AGRICULTURAL SOCIETY.
Convener—John Omand, Hall of Hoxa, St Margaret's Hope, Orkney.
Secretary—George S. Esson, St Margaret's Hope, Orkney.
Granted 1933. (2 Medals.)

5. DENNY AND DUNIPACE AGRICULTURAL ASSOCIATION.
Convener—William Binnie, Braes Farm, Denny.
Secretary—John M'Millan, 37 Stirling Street, Denny.
Granted 1933. (2 Medals.)

1st Year.

6. ARDOCH AGRICULTURAL SOCIETY.
Convener—John Chalmers, Home Farm, Braco Castle, Braco.
Secretary—Anthony Stalker, Broomhill, Braco.
Granted 1934. (2 Medals.)

7. MEIKLEOUR AND DISTRICT AGRICULTURAL ASSOCIATION.
Convener—Alexander Smith, Cranley, Meikleour, by Perth.
Secretary—William Inverarity, C.A., 24 Allan Street, Blairgowrie.
Granted 1934. (2 Medals.)

8. UPPER DONSIDE AGRICULTURAL SOCIETY.
Convener—Alexander Robertson, Upper Towie, Glenkindie.
Secretary—Alexander Kellas, Hillockhead, Cushnie, Alford.
Granted 1934. (2 Medals—Dairy Produce.)

4. SPECIAL GRANTS—1934.

(1) ANNUAL.

1. THE AYRSHIRE AGRICULTURAL ASSOCIATION, £20, to be competed for at the Dairy Produce Show at Kilmarnock.
President—Lord Rowallan, M.C., Rowallan, Kilmarnock.
Convener of Dairy Show Committee—William M'Fadzean, 35 Dundonald Road, Kilmarnock.
Secretary—James A. Paterson, 13 Kyle Street, Ayr.
Granted 1872.

2. THE BRITISH DAIRYMAIDS' ASSOCIATION.
Hon. President—Miss Mitchell of Langlees, Biggar.
President—Mrs William Meiklem, Bennochy Park, Kirkcaldy.
Hon. Secretary—Miss J. Macdonald, 16 Rutland Square, Edinburgh 1.
1 Minor Gold Medal and 1 Medium Silver Medal for Champion Buttermaking Competitions at the Scottish National Fat Stock Club Show, Edinburgh.
Granted 1908.

3. THE NORTHERN COUNTIES ARTS AND CRAFTS SOCIETY, £20.
Convener—Miss Mary Mackintosh, Raigmore, Inverness.
Joint-Secretaries—Mrs Mitford, Berryfield, Lentran, and Miss Ruth Mackintosh, Raigmore, Inverness.
Granted 1922.

4. THE NORTH OF SCOTLAND COLLEGE OF AGRICULTURE.
Secretary—A. A. Prosser, Crown Mansions, 41½ Union Street, Aberdeen.
3 Silver Medals (1 Large, 1 Medium and 1 Minor)—1st, 2nd and 3rd Prizes respectively—for *Sir John Fleming Cup* Stackyard Competition.
Granted 1925.

5. THE SCOTTISH NATIONAL UNION OF ALLOTMENT HOLDERS.
Secretary and Treasurer—Archibald W. Fisher, Solicitor, 18 Hill Street, Edinburgh.
£8 and 8 Medium Silver Medals for best Allotments.
Granted 1927.

(2) In Alternate Years.—Grants in 1934.

6. **Rousay Agricultural Society, Orkney, £3.**
Convener—R. S. Mainland, Westness, Rousay, Orkney.
Secretary—John Linklater, Westness Farm, Rousay, Orkney.
Granted 1903.

7. **South Ronaldshay and Burray Agricultural Society, Orkney, £3.**
Convener—John Omand, Hall of Hoxa, St Margaret's Hope, Orkney.
Secretary—George S. Esson, St Margaret's Hope, Orkney.
Granted 1904.

8. **Shapansay Agricultural Association, Orkney, £3.**
Convener—William T. Wood, Balfour Mains, Shapansay, Kirkwall, Orkney.
Secretary—D. L. Kemp, Bayview, Shapansay, Kirkwall, Orkney.
Granted 1934.

(3) In Alternate Years.—Grants in Abeyance, 1934.

9. **Orkney Agricultural Society, £3.**
Convener—Alexander Calder, Sebay, St Andrews, Orkney.
Joint-Secretaries—D. Flett and J. C. Croy, Junction Road, Kirkwall.
Granted 1883.

10. **East Mainland Agricultural Society, Orkney, £3.**
Convener—James G. Skea, Barns of Ayre, Deerness, Orkney.
Secretary—Alfred C. Tait, Quoyburray, Tankerness, Orkney.
Granted 1898.

11. **West Mainland Agricultural Society, Orkney, £3.**
Convener—J. G. S. Flett, Nistaben, Harray, Orkney.
Secretary—James Wood, Garson, Sandwick, Orkney.
Granted 1900.

12. **Sanday Agricultural Association, Orkney, £3.**
Convener—W. Cowper Ward, Scar House, Sanday, Orkney.
Secretary—John Wallace, Prattsfauld, Sanday, Orkney.
Granted 1902.

13. **Yell Agricultural Society, Shetland, £3.**
Convener—T. R. Manson, Ladybank, Westsandwick, Lerwick.
Secretary—Robert Johnston, The Manse, Westsandwick, Lerwick.
Granted 1931.

5. SCOTTISH WOMEN'S RURAL INSTITUTES.

Regulations, 1934.

1. A sum not exceeding £150 in each year will be given in special Grants to Federations of Scottish Women's Rural Institutes. The amount of any one Grant shall not exceed £10 in any one year.

2. A Federation which has received a Grant for two consecutive years shall not be eligible to again apply until after the expiry of two years.

Grants in 1934.

2nd Year.

1. CAITHNESS FEDERATION.
Convener—Mrs Gore-Browne Henderson, Bilbster, Wick.
Secretary—Miss A. S. M'I. Bain, Bowermadden, Bower, Wick.
Granted 1933.

2. DUNBARTONSHIRE FEDERATION.
Convener—Miss Eunice G. Murray, Moore Park, Cardross.
Secretary—Miss S. E. C. Lumsden, Duncryne, Gartocharn.
Granted 1933.

3. EAST LOTHIAN FEDERATION.
Convener—Mrs Skene-Tytler, Keith Marischal, Humbie.
Secretary—Miss J. N. Tweedie, Eweford, Dunbar.
Granted 1933.

4. MORAY AND NAIRN FEDERATION.
Convener—The Hon. Mrs Campbell, Lethen House, Nairn.
Secretary—Miss I. Brown, Dipple, Fochabers.
Granted 1933.

5. ORKNEY FEDERATION.
Convener—Mrs Leask, 10 King Street, Kirkwall.
Secretary—Mrs Moar, Schoolhouse, Deerness, Orkney.
Granted 1933.

6. PEEBLESSHIRE FEDERATION.
Convener—Mrs Thomson, Kaimes, West Linton.
Secretary—Miss J. Thorburn, Craigerne, Peebles.
Granted 1933.

7. PERTHSHIRE AND KINROSS-SHIRE FEDERATION.
Convener—Mrs Haggart, Eilean Riabhach, Aberfeldy.
Secretary—Miss Ker, Tigh-na-crich, Lochearnhead, Perthshire.
Granted 1933.

8. SELKIRKSHIRE FEDERATION.
Convener—Mrs Meade, The Hangingshaw, Selkirk.
Secretary—Mrs Macgown, Fairholm, Ettrickbridge.
Granted 1933.

9. SUTHERLAND FEDERATION.
Convener—Mrs Serjeantson, Troughend, Brora.
Secretary—Mrs Grant, Pulrossie, Dornoch.
Granted 1933.

1st Year.

10. INVERNESS-SHIRE AND ISLANDS FEDERATION.
Convener—Mrs Ryan, Blar-a-cha, Roy Bridge.
Secretary—Miss J. E. Shaw, Caberfeidh, Fort William.
Granted 1934.

GROUP III.—COTTAGES AND GARDENS, &c.

The following Premiums are offered for Competition.
The Premiums are granted for two years.

1. GRANTS FOR BEST KEPT COTTAGES AND GARDENS.

1.	Best kept Cottage	£1	0	0
	Second best	0	10	0
2.	Best kept Cottage Garden	1	0	0
	Second best	0	10	0

Forms of application may be obtained from the Secretary, and should be completed and returned on or before 1st November next, in respect of a Grant commencing in the following year.

RULES OF COMPETITION.

1. Competitions may take place in the different parishes for Cottages and Gardens, or for either separately.

2. The occupiers of Lodges at Gentlemen's Approach Gates and Gardeners' Houses are excluded, as well as others whom the Committee consider, from their position, not to be entitled to compete. The inspection must be completed by the 1st of October. In making the inspection, the Conveners may take the assistance of any competent judges.

3. It shall be left to the Committee in the District to fix two grades of Cottages, with maximum rents of £6 and £15 respectively, and to apply for £3 Grants in respect of each.

4. To warrant the award of full Premiums, there must not be fewer than three Competitors in each class. If there are less than three competitors in each class, only half Premium will be awarded.

5. A person who has gained the highest Premium cannot compete again.

6. If the Cottage is occupied by the proprietor, the roof must be in good repair; if the roof is thatch, it must be in good repair, though in the occupation of a tenant. The interior and external conveniences must be clean and orderly; the windows must be free of broken glass, clean, and affording the means of ventilation. Dunghills, and all other nuisances, must be removed from the front and gables. In awarding the Cottage Premiums, preference will be given to Competitors who, in addition to the above requisites, have displayed the greatest taste in ornamenting the exterior of their houses, and the ground in front and at the gables.

7. In estimating the claims for the Garden Premiums, the judges should have in view—the sufficiency and neatness of the fences and walks; the cleanness of the ground; the quality and choice of the crops; and the general productiveness of the garden.

8. Reports, stating the number of Competitors, the names of successful parties, and the nature of the exertions which have been made by them, must be lodged with the Secretary of the Highland and Agricultural Society *on or before the 1st November next.*

9. When a grant of Money has expired, the District cannot apply again for aid for four years.

Grants in 1934.

2nd Year.

1. FYVIE HORTICULTURAL AND INDUSTRIAL ASSOCIATION.
Convener—George Morrison, Lawrence Cottage, Fyvie.
Secretary—Leonard Milne, Fyvie Station, Aberdeenshire.
Granted 1933.

2. GLAMIS HORTICULTURAL SOCIETY.
Convener—Rev. M. Babington, The Manse, Glamis.
Secretary—Miss M. Nicoll, Plans of Thornton, Glamis.
Granted 1933.

3. DREGHORN HORTICULTURAL AND AGRICULTURAL SOCIETY.
Convener—Andrew Hood, Gas Works Manager, Dreghorn, Ayrshire.
Secretary—Robert Pryde, Elms Lea, Dreghorn, Ayrshire.
Granted 1933.

1st Year.

4. BISHOPSHIRE HORTICULTURAL SOCIETY.
Convener—William Curtis, Scotlandwell, Kinross.
Secretary—Thomas Buchan, Kinneswood, Kinross.
Granted 1934.

2. MEDALS FOR BEST KEPT COTTAGES AND GARDENS, GARDEN PRODUCE, POULTRY, AND BEE-KEEPING.

RULES OF COMPETITION.

1. The Society will give annually one or two Minor Silver Medals to a limited number of local Associations or individuals, who establish Competitions and Premiums for Cottages, Gardens, Garden Produce, or Bee-Keeping. The Medals will be granted for two years.

2. The Medals may be offered in any two of the following sections, *but under no circumstances will the two Medals be given in one of the sections :—*

(1) Best kept Cottage or best kept Cottage and Garden. (One Medal only.)
(2) Best kept Garden. (One Medal only.)
(3) Best Collection of Garden Produce—Flowers excluded. (One Medal only.)
(4) Best Pen of Poultry. (One Medal only.)
(5) Honey. (One Medal only.)

3. The annual value of each cottage, with the ground occupied in the parish by a Competitor, must not exceed £20. The occupiers of Lodges at Gentlemen's Approach Gates, and Gardeners in the employment of others, are not entitled to compete.

4. If Competition takes place for Garden Produce, such produce must be *bona fide* grown in the Exhibitor's Garden. He will not be allowed to make up a collection from any other Garden. The produce must consist of Vegetables, or Vegetables and Fruit (not Fruit alone). Flowers are excluded.

5. The Honey must be the produce of the Exhibitor's own Hives.

6. To warrant the award of a Medal, there must not be fewer than three Competitors.

7. Forms of Report of Competitions will be furnished to the Secretaries in the different Districts. These must, in all details, be completed and lodged with the Secretary of the Highland and Agricultural Society as soon as possible after the Competition, and in no case later than *1st November,* for the approval of the Directors, against whose decisions there shall be no appeal.

8. If no Competition takes place in a District for two years the grant expires.

9. When a grant of Medals has expired, the District cannot apply again for aid for two years.

Grants in 1934.

2nd Year.

1. GLAMIS HORTICULTURAL SOCIETY.
Convener—Rev. M. Babington, The Manse, Glamis.
Secretary—Miss M. Nicoll, Plans of Thornton, Glamis.
Granted 1933. (2 Medals.)

2. DREGHORN HORTICULTURAL AND AGRICULTURAL SOCIETY.
Convener—Andrew Hood, Gas Works Manager, Dreghorn, Ayrshire.
Secretary—Robert Pryde, Elms Lea, Dreghorn, Ayrshire.
Granted 1933. (1 Medal.)

1st Year.

3. BISHOPSHIRE HORTICULTURAL SOCIETY.
Convener—William Curtis, Scotlandwell, Kinross.
Secretary—Thomas Buchan, Kinnesswood, Kinross.
Granted 1934. (2 Medals.)

GROUP IV.—PLOUGHING, HOEING, AND LONG FARM SERVICE.

1. MEDALS FOR PLOUGHING COMPETITIONS.

The Ploughing Medal will be given to the winner of the first Premium at Ploughing Competitions, provided a Report in the following terms on the official form is made to the Secretary, within one month of the Competition, by a Member of the Society. Forms of Report to be had on application.

FORM OF REPORT.

I, of , Member of the Highland and Agricultural Society, hereby certify that I attended the Ploughing Match of the Association at in the county of on the when ploughs competed ; of land were assigned to each, and hours were allowed for the execution of the work. The sum of £ was awarded as follows :—

[Here enumerate the names and designations of successful Competitors.]

RULES OF COMPETITION.

1. All Matches must be at the instance of a Local Society or Ploughing Association, and no Match at the instance of an individual, or confined to the tenants of one estate, will be recognised.
2. The title of such Society or Association, together with the name and address of its Secretary, must be registered with the Secretary of the Highland and Agricultural Society of Scotland, 8 Eglinton Crescent, Edinburgh.
3. Not more than one Match in the same season can take place within the bounds of the same Society or Association.
4. All reports must be lodged within one month of the date of the Match, and certified by a Member of the Highland and Agricultural Society who was present at it.
5. A Member can report only one Match ; and a Ploughman cannot carry more than three Medals in the same season.
6. To warrant the grant of the Medal, there must have been 12 Ploughs in actual competition for the medal (*i.e., in the particular class for which the medal was offered*) and not less than £3 awarded in Prizes by the Local Society. The Medal to be given to the winner of the first prize.
7. The Local Society or Ploughing Association shall decide what class of ploughs shall compete for the Medal, and if so agreed, may offer it for competition to the class of plough most generally in use in the district.

8. The Local Society or Committee may, if they desire, arrange to let each Ploughman have one person to guide the horses for the first two and the last two furrows, but in no case shall Ploughmen receive any other assistance, and their work must not be set up or touched by others. Attention should be given to the firmness and sufficiency of the work below, more than to its neatness above the surface.

9. The Local Committee is required to fix the time to be allowed for ploughing the portion of land, and they are recommended that the time be at the rate of not more than fourteen hours per imperial acre on light land, and eighteen hours on heavy or stony land.

NOTE.—The attention of the Directors of the Society has frequently been drawn to certain irregularities which have occurred in connection with the conduct of Ploughing Matches and the completion of the Reports thereon. Complaints have been made (*a*) that the allotted amount of ground has not been ploughed, within the specified time, by the competitor awarded the first prize; (*b*) that the Report sent to this Society has been signed by a Member of the Society who was not present at the Match. It has to be pointed out that any infringement of the above Rules by a Local Society or Ploughing Association will render that Society or Association liable, at the discretion of the Board of Directors, to be debarred from receiving the Society's Medals in future.

2. MEDALS FOR HOEING COMPETITIONS.

The Minor Silver Medal will be given to the winner of the first Premium at Hoeing Competitions, provided a Report in the following terms on the official form is made to the Secretary within a month of the Competition by a Member of the Society. Forms of Report to be had on application.

RULES OF COMPETITION.

1. All Matches must be at the instance of a Local Society or Hoeing Association, and no Match at the instance of an individual, or confined to the tenants of one estate, will be recognised.

2. The title of such Society or Association, together with the name and address of its Secretary, must be registered with the Secretary of the Highland and Agricultural Society of Scotland, 8 Eglinton Crescent, Edinburgh.

3. Not more than one Match in the same season can take place within the bounds of the same Society or Association.

4. All reports must be lodged within one month of the date of the Match, and certified by a Member of the Highland and Agricultural Society who was present at it.

5. A Member can only report one Match; and same Competitor cannot carry more than three Medals in the same season.

6. To warrant the grant of the Medal there must have been twelve hoes in Competition, and not less than Three Pounds awarded in prizes by the Local Society or Association. The Medal to be given to the winner of the first prize.

7. The time to be allowed to be decided by the local Committee, but in no case to exceed two hours for two drills of 100 yards each, the third drill being unoccupied, so that Competitors do not interfere with their neighbour's work.

8. Competitors must finish their work as they go along—no turning back or after-dressing allowed. Hand-picking or transplanting shall be strictly prohibited.

9. A Committee shall be appointed to watch the work, and any Competitor found transplanting or otherwise not complying with the Rules shall have his number withdrawn, and be debarred from receiving any prize which might otherwise have been awarded to him.

NOTE.—Medals will be awarded under similar conditions for Competitions in hand-singling.

3. CERTIFICATES AND MEDALS FOR LONG FARM SERVICE.

Certificates and Silver Medals for long service will be awarded by the Society to farm servants, male or female, having an approved service in Scotland of not less than thirty years—(*a*) with one employer on the same or different holdings ; (*b*) on the same holding with different employers.

Special Certificates and Gold Medals are also awarded to farm servants, male or female, having an approved service in Scotland of not less than forty-five years, on similar conditions of employment as the above.

These Certificates and Medals will be issued as applications are received.

Forms of Application are obtainable from the Secretary, 8 Eglinton Crescent, Edinburgh.

War Service to count towards the time required for qualification, where farm servants have returned to same service or employment with same farmer or his family.

Estate workers, such as Foresters, Carters, Grooms, &c., are not eligible. The award is strictly confined to **Farm** workers, such as Ploughmen, Shepherds, &c.

NOTE.—From 12th to 21st June all communications for the Secretary should be addressed to him at the Secretary's Office, Showyard, Bellahouston Park, Glasgow.

Address for Telegrams—"SOCIETY," EDINBURGH.
Telephone No.—EDINBURGH 23655.

HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND

GENERAL SHOW OF STOCK, IMPLEMENTS AND MACHINERY

GLASGOW

19TH, 20TH, 21ST, AND 22ND JUNE 1934.

LAST DAYS OF ENTRY.

IMPLEMENTS AND OTHER ARTICLES—Monday, 2nd April.
NEW IMPLEMENTS—Monday, 2nd April.
HORTICULTURAL SECTION—Saturday, 21st April.
CATTLE, HORSES, SHEEP, GOATS, AND PIGS—Wednesday, 2nd May.
(*Separate Form for* EACH *Entry.*)
DRAUGHT GELDINGS IN HARNESS—Tuesday, 12th June.
HORSES IN HARNESS IN VAN OR LIGHT LORRY—Tuesday, 12th June.
POULTRY, DAIRY PRODUCE, EGGS, RURAL INDUSTRIES, AND HORSE-SHOEING AND SHOE-MAKING—Wednesday, 2nd May.
RABBITS, HONEY, AND STOCK JUDGING COMPETITION—Thursday, 17th May.
BUTTERMAKING COMPETITIONS—Thursday, 24th May.
BACON PIG COMPETITION—Thursday, 24th May.

President of the Society.

THE EARL OF HOME, K.T.

Chairman of the Board of Directors.

ALEXANDER MURDOCH, EAST HALLSIDE, CAMBUSLANG, LANARKSHIRE.

Convener of the Local Committee.

COLONEL W. T. R. HOULDSWORTH OF KIRKBRIDE, MAYBOLE.

The District connected with the Show comprises the Counties of Argyll, Ayr, Bute, Lanark and Renfrew.

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REGULATIONS.

GENERAL CONDITIONS.

1. The Competition, except where otherwise stated in the Premium List, is open to Exhibitors from all parts of Great Britain, Northern Ireland, and Irish Free State.

Entries.

2. Every Lot must be intimated by a Certificate of Entry, lodged with the Secretary *not later than Monday, 2nd April, for Implements, New Implements, and other Articles; Saturday, 21st April, Horticultural Section; Wednesday, 2nd May, for Stock, Poultry, Dairy Produce, Eggs, Rural Industries, and Horse-shoeing and Shoe-making: Thursday, 17th May, for Rabbits, Honey, and Stock Judging Competition; Thursday, 24th May, for Buttermaking Competitions and Bacon Pig Competition; Tuesday, 12th June, Draught Geldings in Harness and Horses in Harness in Van or Light Lorry.* Printed forms of Entry will be issued on application to the Secretary, No. 8 Eglinton Crescent, Edinburgh 12. Admission Orders for Exhibits and Attendants will be forwarded to Exhibitors, by post, previous to the Show.

Substitution of Entry in same Class.

Between 2nd May and 24th May an Exhibitor who has made, in due time, an entry of Horses, Cattle, Sheep, Goats, or Pigs, in a particular class, will be permitted to substitute for it an entry of another animal in the *same class* on payment of a fee of Five Shillings each entry.

Licenses for moving Stock.

3. This Premium List is published and the Show will be held subject to any Orders that may be issued by the Ministry of Agriculture or Local Authorities. Any licences that may be required for the movement of Stock into or away from the Show must be obtained by Exhibitors. For these licences application should be made to the Chief Constable, Glasgow.

Diseased Animals.

4. Animals suffering from any form of infectious or contagious disease—including ringworm or other form of infectious or contagious skin ailment—must not be brought to the Show. Those infringing this Rule shall be liable to a fine of 40s., and to have their Stock removed.

Horses suffering from cold.

The Steward of Horses shall have power to require that any animal showing symptoms of cold be examined by the Veterinary Surgeon, and, if found to be so suffering, the animal shall be isolated or excluded from the Showyard.

Fees to accompany Entries.

5. No Entry can be received or recorded unless it is accompanied by the necessary fees, and complies fully with the Regulations in the Premium List, the Secretary being empowered to return entries sent without the necessary fees.

Particulars of Entries.

6. The Schedule of Entry must be filled up so far as within the knowledge of the Exhibitor. The Society shall have power at any

time to call upon an Exhibitor to furnish proof of the correctness of any statement in his entry.

Name of Breeder. 7. The name of the Breeder, if known, must be given, and if the Breeder is not known, a declaration to that effect, signed by the Exhibitor, must be made on the Entry Schedule, and no pedigree will be entered in the Catalogue when the Breeder is unknown.

No Substitution of Animals. 8. All animals, except calves, foals, and lambs shown with their dams, must be entered in the classes applicable to them, and cannot be withdrawn after entry, or other animals be substituted in their place, except as provided in Rule 2.

One Class only. 9. For Prizes given by the Society, no animal shall be allowed to enter in more than one class, or to compete in any class except that prescribed for animals of its pedigree and description; but this Rule does not apply to the Jumping Classes.

Ownership. 10. All stock exhibited at the Show, except where otherwise stated in the Premium List, must be, at the time of entry, the *bona fide* property of the Exhibitor in whose name it is entered.

Responsibility for Entries. 11. Exhibitors are alone responsible for the accuracy and eligibility of their entries. The recording of an entry or the admission of the exhibit to the Showyard will not relieve the Exhibitor of this responsibility. The entry fee paid for an animal entered in a class for which it is not eligible is not returnable.

Cancelling of Entries. 12. In the event of the entries in any section of Cattle, Horses, Sheep, Goats, or Pigs being less in number than an average of three per class, or the number of different Exhibitors in the section being less than three, the classes for that section shall be cancelled automatically for the year and the entry fees returned.

Society not liable. 13. The Society shall not be liable for any loss or damage which Stock, Poultry, Dairy Produce, &c., Implements, or other articles may sustain at the Show, or in transit.

Disqualified Exhibitors. 14. The Society reserve to themselves the right of refusing, cancelling, or prohibiting the exhibition of entries from any person who, after 1st January 1904, has been expelled from the membership of any Agricultural or Dairy Society, or who may have been prohibited, suspended, or disqualified from making entries or exhibiting at the Show or Shows of any Agricultural or Dairy Society or Breed Society in consequence of having attempted to obtain a Prize by giving a false Certificate, or by other unfair means, or who is under exclusion from any Breed Society for fraudulent practices.

Animal Disqualified. 15. When an animal has previously been disqualified by the decision of any Agricultural or Breed Society in the United Kingdom, such disqualification shall attach, if the Exhibitor, being aware of the disqualification, fail to state it, and the grounds thereof, in his entry, to enable the Directors to judge of its validity.

Tampering with Animals. 16. Any artificial contrivance or device of any description found on or proved to have been used on an animal, either for preventing the flow of milk or for any other improper purpose, will disqualify that animal from being awarded a Premium, and the Owner of said animal may be prohibited from again entering Stock for any of the Society's General Shows, for such a period as the Directors may see fit.

Blindfolding Horses. 17. Horses shall not be blindfolded while being shown in the Ring.

Rejecting Entries. 18. The Society further reserve to themselves the right of refusing any entries they may think fit to exclude, or to cancel any entry made, or to prohibit the exhibition of any entry.

Control of Exhibits.

19. Stock entered for competition, and actually in the Show, is subject to the control and under the orders of the Stewards, Secretary, and other Show officials of the Society, and such stock may not be withdrawn from competition without the consent of the Stewards or Secretary.

Improper Conduct.

20. Persons making insulting remarks to, or in any way unduly interfering with, the Judges, Stewards, or other officials while in the performance of their duties, and all Exhibitors or others in charge of stock while in the Judging Rings refusing to accept or display tickets, rosettes, &c., awarded by the Judges, and handed to them by the Stewards or other officials, or tearing up tickets, rosettes, &c., so awarded and handed to them, or indulging in any similar conduct, shall be considered guilty of misconduct, and shall be dealt with under these rules.

Subject to Orders.

21. All persons in charge of stock or other exhibits, and all persons admitted into the Showyard, shall be subject to the rules of the Society, and shall obey the orders of the Stewards, Secretary, and other officials of the Society. Exhibitors shall be answerable for the conduct of their servants or representatives.

Power of Officials.

The Stewards and other officials have power to enforce the Regulations of the Society in their different departments.

Protests.

22. A protest having reference to exhibits at the Show may be lodged by any person having interest. Protests having reference to competitions which take place on the first day of the Show must be lodged in writing with the Secretary at his Office in the Showyard not later than 9 A.M. on Wednesday, the second day of the Show, and parties must be in attendance at the Secretary's Office in the Showyard at 9.30 A.M. that day, when protests may be disposed of. Protests relating to competitions taking place after the first day of the Show must be lodged before 5 P.M. on the day on which the particular exhibition takes place. Each protest must state specifically the grounds of objection, and must be accompanied by a deposit of £2, 2s., which deposit may, if the objection be proved frivolous to the satisfaction of the Directors, be forfeited. Protests may be lodged at any time by Directors, and in this case no deposit will be required. Protests will be heard and determined by the Directors. Protests on veterinary grounds not received.

Penalties for Offences.

23. The violation of any one of the Regulations, or disobedience of the orders of the Directors, Stewards, Secretary, or other officials of the Society, shall render the offending person liable to the forfeiture of all Premiums awarded to him, or of such a portion as the Directors may ordain, and also liable to be expelled from the membership of the Society, and disqualified from again, or for a certain number of years, exhibiting at the Shows of the Society, or to have his case disposed of by fine or otherwise as the Directors may determine.

Final Authority.

24. The decision of the Directors shall, in every matter arising at or in connection with the Show, be final; and every person present at the Show, whether as a Judge, Exhibitor, Visitor, or otherwise, shall be deemed thereby to have agreed to refer the subject-matter of such decision to the final determination of the Directors to the exclusion of all Courts of Law.

Intimating Decisions.

25. All decisions under these Rules may, along with the names and addresses of the persons against whom such decisions have been pronounced, be communicated by the Secretary of this Society to the Secretaries of all Agricultural or Dairy Societies holding open Shows in the United Kingdom, and to the Secretaries of all Breed Societies in the United Kingdom, and may be published in the Annual Reports

of this Society, and in such newspapers or journals as the Directors may determine; and every Exhibitor competing at the Show, and every person present at the Show, whether as a Director, Member of Committee, Steward, Judge, Exhibitor, Visitor, or otherwise, shall be deemed thereby to have consented to such communication and publication.

Former Winners. 26. An animal to which a first Premium has been awarded, even if it should not qualify for that Premium, or an animal which subsequently becomes entitled to a first Premium, at a General Show of the Society, cannot again compete in the same class, notwithstanding any alteration in the heights stated for such class, but may be exhibited as Extra Stock (see page 138).

Herd-books. 27. Shorthorn, Aberdeen-Angus, Galloway, Belted Galloway, Highland, British Friesian, and Red Poll cattle must be entered in the herd-books—Ayrshire Cattle in the herd-book or any Appendices thereto—or the Exhibitor must produce evidence that his animal is eligible to be entered therein. Dun Galloways entered in the ordinary Galloway classes must be registered in, or eligible for entry in, the Galloway Cattle Society's herd-book.

Height of Horses. 28. All Horses or Ponies entered in classes in which a particular height is stated shall, before being judged, be measured with their shoes on. No subsequent measuring or alteration of shoes will be permitted. In the case of Highland and Western Island Ponies, these may be measured without shoes, the height limit in such cases being reduced by quarter of an inch.

Weight of Shoes. 29. Exhibitors of Hackney and Harness Horses shall be required to adhere to the Rules and Regulations of the Hackney Horse Society with regard to the weight of shoes on their exhibits, the Society's Veterinary Inspector being instructed to examine all the Hackneys and Harness Horses on the second morning of the Show and see that the following Rules as to the weight of shoes are attended to—viz., (*a*) For Hackneys exceeding 14 hands (except Hackney yearling colts and Hackney yearling fillies), no shoe (nails included) may exceed 2 lb. in weight; (*b*) for Ponies not exceeding 14 hands, Hackney yearling colts and Hackney yearling fillies, no shoe (nails included) may exceed 1½ lb. in weight.

Overfeeding. 30. Breeding Stock must not be shown in an improper state of fatness, and the Judges are requested not to award Premiums to overfed animals; and no Cattle or Sheep which after the age of twelve months have been exhibited as Fat Stock at any Show are eligible to compete in the Breeding Classes for the Society's Prizes.

Sires. 31. Aged Bulls and Stallions must have had produce, and, along with two-year-old Bulls, three-year-old Colts, and two-shear and aged Tups, have served within the twelve months immediately preceding the Show.

Calving Cows. 32. Except as may be otherwise specially provided in this Premium List, cows of all breeds (other than Ayrshire, British Friesian, and Red Poll) must have had a live or full-time calf on or after 1st September of the year preceding the year of the Show, and before the first day of the Show, and when exhibited must be in milk. Cows of the Ayrshire, British Friesian, and Red Poll breeds must have had a live or full-time calf within fifteen months previous to the Show. *Animals of any age that have had a calf must be shown as Cows.*

In-calf Heifers. 33. Two-year-old Heifers of the Shorthorn, Aberdeen-Angus, Galloway, Belted Galloway, Ayrshire, British Friesian, and Red Poll breeds, and three-year-old Highland Heifers, must be in calf when exhibited, and the Premiums will be withheld till birth be certified, which must be within nine months after the Show.

34. A Mare entered in a class for "Mares with foal at foot" must have produced a foal after 1st January of the year of the Show, must have regularly nursed her own or another foal, and must (except where otherwise provided) have the foal with her in the Show. If the mare's own foal is alive it must be the foal shown with the mare. In the case of a Mare that has not foaled before the Show, or whose foal has died, she shall, if not in milk, be eligible without further entry to compete among the Yeld Mares if a corresponding class for Yeld Mares be included in the Premium List. Draught Yeld Mares must produce a foal not later than 1st August of the year following the year of the Show. A Mare in a class for "Mares or Geldings" may or may not have had a foal in the year of the Show, but shall not have her foal exhibited with her, nor be in milk at the time of the Show. *Mares.*

35. All Sows born in or before 1932 must have produced a litter of pigs in the year of the Show before the opening day. Sows born between 1st January and 1st September 1933 must either have produced a litter of pigs before the Show, or produce a litter within three months of the last day of the Show. Certificates of the date of farrowing must be supplied in every case. *Sows.*

36. With reference to Regulation 33, birth of a live or full-time calf must be certified; and in regard to Regulation 34, birth of at least a nine months' foal; or in the case of the death of the dam, a Veterinary Surgeon's certificate must be produced certifying that at the time of death the animal was so far advanced with calf or foal that if it had lived it would have produced a full-time calf or foal within the periods stated in Regulations 33 and 34. Certificates required by the foregoing Regulations will be issued after the Show, and must reach the office of the Secretary as follows: calving certificates within ten months, foaling certificates within thirteen months, and farrowing certificates within four months, of the last day of the Show. In default of this, the animal will be regarded as having failed to fulfil the Regulations, and the Prize will therefore pass to the animal next in order of merit or be forfeited. *Calves and Foals. Calving, Farrowing, and Foaling Certificates.*

37. Except when otherwise provided, the awards of Special Prizes shall not be subject to the Regulations as to calving, foaling, and farrowing. *Special Prizes.*

38. The Premiums awarded, except those withheld till birth of calf or foal or litter of pigs is certified, will be paid as soon after the Show as practicable, and, with the exception of the Tweeddale Gold Medal, Special Cups, and Medals, may be taken either in money or in plate. *Payment of Prizes.*

39. No Stallion or entire Colt, two years old or upwards, shall be allowed to compete for any of the Society's Prizes unless it has previously been licensed for stud purposes during the current year by the Department of Agriculture for Scotland, the Ministry of Agriculture and Fisheries, or the Irish Department of Agriculture. *Veterinary Examination of Stallions and Colts.*

40. Judges are particularly requested to satisfy themselves, as far as possible, regarding the soundness of all Horses before awarding the Prizes, and to avoid giving Prizes to animals showing symptoms of hereditary disease. The Judges may consult the Society's Veterinary Surgeon if they deem it expedient. Private accommodation is provided for the examination of horses by the Veterinary Surgeon. No protests on veterinary grounds will be received. *Soundness of other Horses. Accommodation for examination.*

41. Every Ewe must have given birth to and reared a lamb in the year of the Show; and Ewes of the Blackface and Cheviot breeds must be in milk, and have their lambs at foot. *Ewes.*

Milking. 42. Animals in milk of the Dairy breeds must be milked dry at 6 o'clock on the evening previous to the opening of the Show in the presence of, and to the satisfaction of, the Steward of Cattle or a representative of the Society duly authorised by him. Animals arriving after six o'clock will be milked dry at the time of arrival.

All animals in milk, in the Ayrshire Cattle Classes and Dairy Cow Class, must be milked out in the ring before the awards are made.

Clipping. 43. Sheep must have been clipt bare after the first day of the November preceding the Show, no part of the animal to be clipt prior to that date—this Rule not to apply to Cheviot Sheep.

No Blackface Sheep shall be eligible (except where otherwise provided) which has not been clipt bare on or after the 1st April of the year of the Show.

Colouring, &c., of Sheep and Pigs. 44. The Steward of Sheep, who can call in assistance if so desired by him, shall have full power to disqualify any pen of Blackface, Cheviot, Border Leicester, and Half-bred Sheep which he considers unnaturally coloured, or when the fleece, face, or legs have been dealt with by the use of foreign substances other than ordinary dips or bloom dips.

The use of artificial whitening or powder on Large White Pigs is prohibited, and the Judge is empowered to disqualify any pig so whitened or powdered.

Flock Books. 45. All Oxford Down and Suffolk Sheep shown must be entered or eligible for entry in the Oxford Down and Suffolk Flock Books respectively.

Poultry. 46. In Poultry the Aged Birds must have been hatched previous to, and Cockerels and Pullets in, the year of the Show.

Railway Passes. 47. Railway Certificates for Stock, for both outward and return journeys, will be issued to Exhibitors before the Show along with their Tickets of Admission (see page 104).

Admission of Stock. 48. Poultry and Stock will be admitted on Monday, the day before the opening of the Show, and, with the exception of Horses, must be in the Yard before 12 o'clock that night. Horses must be in before 8 o'clock on the morning of Tuesday, except those entered in classes for which other times for arrival are elsewhere stated in this Premium List. Judging begins at 9.30 A.M. on Tuesday. Poultry and Stock will be exhibited on Tuesday, Wednesday, Thursday, and Friday. Any animals selected by the Stewards may be required to take part in the Stock Judging Competition on the Thursday. Stock may be admitted on the Saturday preceding the Show, but only by sending two days' prior notice to the Secretary's Office in the Showyard.

Parades. 49. Horses and Cattle must be paraded at the times stated in the Programme of the Show, and when required by the Stewards, and under their direction. Females of the Highland Cattle breed born in or after 1927 must be paraded; those born before 1927 will be paraded at the option of the Exhibitor. In Parade, Horses must be ridden or led as provided in their respective classes. Prize and commended Cattle and Horses will receive two rosettes each, which must be attached to the head of the animal, one on each side. Attendants must be beside their animals *forty-five minutes before the hour of Parade*, and be ready to proceed to the ring immediately on receiving the order of the Stewards. Infringement of this Rule, or failure of any attendant to obey the orders of the Society's officials, will render the Exhibitor liable to a fine of 20s. for each separate infringement or act of disobedience, and to the forfeiture of any or all of the Prizes awarded to him at this Show.

Responsibility of Exhibitors.

50. Exhibitors shall be answerable for all acts, whether committed by themselves, their servants, or others in charge of their Stock, and shall be responsible for the condition of their animals during the whole time they remain in the Showyard.

Moving from stalls.

51. No animal shall be taken out of its stall after 10 A.M. during the Show except by order of the Stewards, or with permission of the Secretary.

Washing Cattle.

52. Cattle shall not be taken out of their stalls to be washed after the Judging has commenced. Cattle must not be washed beside the Judging Rings. Those infringing this Rule shall be liable to a fine of 10s.

Soaping prohibited. Colouring matter.

53. Soap or other adhesive material must not be used in dressing cattle or horses. The use of blacking or other colouring matter on cattle is prohibited. Infringement of this Rule will render the animal upon which the material is used liable to be disqualified.

Loose-boxes and Stalls.

54. Loose-boxes will be provided for all horses; covered accommodation for other live stock. Stalls for nurse cows charged at ordinary rates. Boxes (floored) for attendants on Cattle, Horses, Sheep, Goats, and Pigs will be provided at a charge of 40s. for each box for members; 50s. for non-members. (See Rule 79.)

Floored Boxes and Stalls for Animals.

55. Exhibitors requiring the boxes, stalls, or pens for their animals to be floored must give instructions, stating the Catalogue No., to the Society's Showyard Erector, Mr John Reid, Showyard, ten days before the Show opens. (For charges, see Rule 78.)

Securing Cattle.

56. Bulls must be secured by nose-rings, with chains or ropes attached, or with strong halters and double ropes. All Cattle, other than Highland Cattle, must be tied in their stalls.

Concealing Animals.

57. During the time the Show is open to the public no rug shall be hung up so as to conceal any animal in a horse-box or stall, except with the special permission of the Steward of that department.

Fodder.

58. Five days' supply of straw, hay, grass, and tares will be provided free by the Society. Any additional fodder or other kinds of food required will be supplied at fixed prices in the Forage-yard. The Forage-yard will close at 1.30 P.M. on Friday, the last supply to be given to attendants then; and if any extra supply is required on account of stock remaining in the Yard after the close of the Show, notice must be given to the Forage Steward not later than 5 o'clock on Thursday. Any servant removing bedding from an adjoining stall will be fined in double the amount taken. Exhibitors may fetch their own cake or corn to the Yard, but not *grass, tares, hay, or straw.* Coops, food, and attendance for Poultry and Rabbits will be provided by the Society.

Feeding appliances.

59. Servants in charge of Stock must bring their own buckets or pails and a piece of rope or sheep-net to carry their forage. Mangers, and sheep and pig troughs, will be provided.

Sawdust.

60. Sawdust must not be used as bedding for Stock.

Water.

61. As the command of water in the Yard is limited, it is particularly requested that waste be avoided.

Lights and Smoking. Closing of Gates.

62. No lights allowed in the Yard at night, and Smoking is strictly prohibited within the Sheds. Those infringing this Rule shall be liable to a fine of 10s. The gates will be closed at midnight, and no person shall be allowed to enter or leave the Yard between that time and 5 A.M. without a special permit.

Removal of Stock.

63. Stock or Poultry cannot be removed from the Yard till 5 P.M. on Friday, the last day of the Show, except on certificate by the Veterinary Surgeon employed by the Directors, countersigned by the Steward of the department or the Secretary.

Withdrawal of horses overnight. 64. At the close of the Show on Tuesday, Wednesday, and Thursday, horses may be withdrawn for the night on a deposit of £5 for each animal, which shall be forfeited, along with any prize money it may have gained, if the animal is not brought back. They must return between 7 and 7.30 the following morning, and those not in before 8 shall forfeit 10s. Horse passes to be applied for at the Secretary's Office between 5 and 6 P.M. on Tuesday, and the deposit, unless forfeited in whole or in part, will be returned between 12.30 and 2.30 on Friday.

Order in removal. 65. When the Stock is leaving the Yard, no animal is to be moved till ordered by those in charge of clearing the Yard. Those transgressing this Rule shall be liable to a fine of 10s., and to be detained till all the other Stock is removed.

Penning and removing Poultry. 66. Poultry may be penned before the opening and removed at the close of the Show by Exhibitors themselves or their representatives. In the event of neither the Exhibitor nor an authorised representative of the Exhibitor being present to pen or remove Poultry, the birds will be penned and removed by men hired and paid by the Society, but this will be done on the understanding that the men are hired to do the work on behalf of Exhibitors, and solely at their risk, and that the Society will be in no way responsible for expenses incurred or loss of or injury to Exhibits by errors or accidents in penning, despatching, or conveying Exhibits.

Closing of Poultry Shed to Public. 67. On the opening day of the Show the Poultry Shed will be closed to the public during the Judging. On the last day of the Show the Poultry Shed will be closed to the public at 4 P.M.; at 5 P.M. Exhibitors or their representatives will be admitted to the Shed to remove Exhibits, provided the Exhibitor has, *not later than* 11 A.M. *on the last day of the Show*, given written notice to the Secretary to the effect that the Exhibitor or the Exhibitor's representative will attend at the Poultry Shed at 5 P.M. to remove the birds.

JUDGING STOCK AND POULTRY.

Opening Gates. 68. On Tuesday, the first day of the Show, no person will be admitted, except Servants in charge of Stock, till 8 A.M., when the Gates are opened to the public.

Judging. 69. The Judges will commence their inspection at 9.30 A.M. The spaces reserved for the Judging will be enclosed, and no encroachment thereon shall be permitted.

Insufficient merit. 70. In no case shall a Premium be awarded unless the Judges deem the animals to have sufficient merit; and where only one or two lots are presented in a class, and the Judges consider them unworthy of the Premiums offered, it shall be in their power to award a lower prize.

Commendations. 71. In addition to the Premiums, the Judges may award **one** Very Highly Commended, **one** Highly Commended, and as many Commended tickets in each class as they consider justified by the number and merit of the entries.

Ayrshire and British Friesian Cows and Heifers. 72. Ayrshire and British Friesian Cows which have not calved before the Show, whether entered in a class for Cows in Milk or for Cows in Calf, shall be judged along with the Cows in Calf, and Ayrshire and British Friesian Cows or Heifers which have calved before the Show—in whichever of the classes entered—shall be judged along with Cows in Milk. Heifers entered in a Milk Class, which have not calved before the Show, will be judged along with Heifers in Calf.

73. Attending Members will accompany the Judge of each section. It will be the duty of Attending Members to bring the animals out to the Judges and to see that no obstruction is offered to them, and that the space reserved for them is not encroached upon; to ticket the prize animals; to send the Nos. of the prize animals to the Award Lectern near the Secretary's Office; to assist the Judges in completing their return of awards; and should any difficulty arise, to communicate with the Stewards or Secretary. *Attending Members' duties.*

74. It shall not be competent for any Exhibitor, nor for his Factor or Land-Steward, to act as a Judge or Attending Member in any class in which he is competing.

DAIRY PRODUCE.

75. Dairy Produce will be received in the Showyard on Monday, the day before the opening of the Show, and till 8 A.M. on Tuesday, the first day of the Show. Judged at 9.30 A.M. on Tuesday. Exhibited Tuesday, Wednesday, Thursday, and Friday.

76. Dairy Produce must have been made on the Exhibitor's farm in the year of the Show. No Exhibitor shall show more than **one** lot in each class. Exhibits of Dairy Produce may be placed before the opening and removed at the close of the Show by Exhibitors themselves or their representatives. In the event of neither the Exhibitor nor a person with written authority from the Exhibitor being present to place or remove exhibits, they will be placed and removed by men hired and paid by the Society, but this will be done on the understanding that the men are hired to do the work on behalf of Exhibitors, and solely at their risk, and that the Society will be in no way responsible for expenses incurred or loss of or injury to exhibits by errors or accidents in placing, despatching, or conveying exhibits. In the case of exhibits which are not removed by 5.30 P.M. on the closing day of the Show, the Society will hold itself at liberty to hand them over to the railway companies for despatch to the respective Exhibitors. *Placing and removing Dairy Produce.*

STALL RENT.

77. The Stall Rents (which include Entry Fees), as stated opposite the individual classes in this List, shall be paid by Exhibitors when making their entries. The Secretary is instructed to return entries sent without the necessary fees. *Stall Rent.*

FLOORED BOXES AND STALLS.

78. Exhibitors desiring the boxes, stalls, or pens for their animals to be floored can have this done by giving instructions, stating the Catalogue No., ten days before the opening of the Show, to the Society's Showyard Erector (Mr John Reid, Showyard, Bellahouston Park, Glasgow), to whom the following charges for flooring have to be paid: Horses, 30s. each; Ponies, Cattle, Sheep, Goats, and Pigs, 20s. each. *Floored Stalls for Animals.*

ACCOMMODATION FOR ATTENDANTS.

Accommodation for Attendants. 79. Boxes for accommodation of attendants on Stock will, if desired, be provided beside the Stock at a charge of 40s. per box for members and 50s. for non-members. Attendants' boxes will be floored and lined with wood, with door. Applications for attendants' boxes must accompany entries of Stock, and in the case of Belted Galloway, Ayrshire, British Friesian, and Red Poll Cattle and all Horses, Exhibitors must state, at the time of entry, the animal next to which the attendant's box is to be placed. Attendants' boxes in the other Cattle Sections and the Sheep, Goat, and Pig Sections will be erected at the end of each run of shedding. Attendants' boxes cannot be guaranteed after the closing date.

IMPLEMENTS AND OTHER ARTICLES.

Admission of Goods. 80. Implements will be received in the Yard from Tuesday, 12th June, till 5 o'clock on the afternoon of Monday, 18th June. Exhibited Tuesday, Wednesday, Thursday, and Friday. The Schedule of Entry must be filled up so far as within the knowledge of the Exhibitor, and prices must be stated.

Premiums. 81. No Money Prizes or Medals, except when specially offered, will be given by the Society for Implements of any kind.

Refusing Entries. 82. Agricultural Implements, and Implements and collections of articles not Agricultural, will be received for Exhibition, but the Secretary is entitled to refuse entries from dealers in articles not deemed worthy of Exhibition.

Local Operatives. 83. In order to encourage exhibits of Agricultural Implements from operative Blacksmiths and Carpenters in the district of the Show, open space will be provided for these in some less prominent part of the Yard at a charge of 15s. for space 10 feet wide and 20 feet deep.

Articles not entered. 84. Every article to be exhibited must be entered on the Society's Entry Form. Any article not so entered that is taken to the Show is liable to be ordered out of, or removed from, the Showyard, or confiscated to the Society. Exhibitors infringing this Rule are moreover liable to a fine of £1.

Selling by auction and noisy behaviour forbidden. 85. "Cheap-Jacks" are not admitted to the Showyard. The selling of goods by auction, shouting, and other behaviour calculated to annoy visitors or Exhibitors, are strictly forbidden. The use of mechanical loud-speaking appliances is also prohibited. Exhibitors infringing this Regulation are liable to a fine of £1, and to have themselves and their goods ordered out of, or removed from, the Showyard, or to have their goods confiscated to the Society.

Placing Exhibits. Removing Exhibits. 86. The articles of each Exhibitor must all be placed in one stand, except Implements in motion, and must not on any account extend beyond the allotted space. No article shall be moved out of its Stand, or the Stand dismantled, till the termination of the Show, at 5 P.M. on Friday.

Restoring Turf. 87. When the ground requires to be broken, the turf must be carefully lifted and laid aside, and the surface must be restored to the satisfaction of the Society, and at the expense of the Exhibitor. Failing this being done, the Society shall be at liberty to restore the ground and charge the cost to the Exhibitor.

Arranging Exhibits. 88. Exhibitors must arrange their own articles *within* the space allotted to them before 9 o'clock on Tuesday, the first day of the

Show, and to the satisfaction of the Stewards in charge of the Implement Yard. Exhibitors are prohibited from sub-letting space allotted to them, and from displaying the name of any other firm on their Stand. All signs, except signs on gables, must face the front only. Nails must not be driven into the canvas. *Signs.*

89. Exhibitors are not allowed to distribute handbills anywhere in the Yard except at their own Stand; and they must not for this or any other purpose encroach upon the adjacent alleys or open spaces. *Handbills.*

90. Exhibitors are required to have their Stands and the portions of the alleys immediately adjoining them swept up before eight o'clock on each morning of the Show. *Sweeping Stands, &c.*

91. All Machines requiring steam or fire must be entered as such in the Certificate, and will be placed in the Motion Yard. *Coke only shall be used in all cases where fire is required.* Coal shall not be used at any time in the Showyard. Those infringing this Rule shall incur a penalty of £5. *Fuel.*

92. No Steam Engine shall be driven in the Yard at a greater speed than 4 miles an hour. Traction Engines shall not be used in conveying Exhibits or other goods into or out of the Showyard or from one place to another therein. *Steam Engines.*

93. Locomotive and Traction Engines and other Machines must not be moved from their places without permission of the Secretary or Stewards, and must not leave their Stands till 6 P.M. on Friday. *Traction Engines.*

94. There must be attached to each Implement, when forwarded to the Show, a label bearing the Exhibitor's name, and that of the Implement, as well as the number of the Exhibitor's Stand. *Consigning Implements.*

95. The carriage of all Implements must be prepaid.

96. Photographing in the Showyard is not permitted, except by photographers having a Stand in the Showyard or holding a "Photographer's Ticket." The "Photographer's Ticket" may be had from the Secretary, price 20s. It admits the holder to the Show when open to the public, and entitles him to photograph in the Showyard, subject to arrangements made by the Stewards. It does not entitle the holder to sell photographs in the Showyard. No photographer shall be allowed in the ring during Parades, except with the sanction of the Steward of Parades. *Photographing in Showyard.*

97. Covered Booths for Offices (9 feet by 9 feet), purely for business, not for exhibition of goods, can be had for £5 to Members and £7 to Non-Members. *Offices.*

98. Each Exhibitor in the Implement Department who is not a Member of the Society will receive one free Ticket of Admission to the Showyard for himself or a member of his firm. All Exhibitors will receive, for the use of attendants employed by him at his Stand, two Tickets of Admission for each complete ten feet of shedding in the Motion Yard, and one Ticket for each complete ten feet of shedding in the other sections. No additional Free Tickets can be issued in any circumstances whatever. Additional Attendants' Tickets, not more than three for each ten feet of frontage, and in no case exceeding a maximum of twenty for one Exhibitor, may be obtained by application in writing by the Exhibitor at 5s. each. *No tickets will be issued without an Order.* *Exhibitors' and Attendants' Tickets.*

99. The Tickets of Admission for Exhibitors and Attendants referred to in the foregoing Regulations will (about fourteen days prior to the Show) be issued to the Exhibitors in blank, with the number of the Exhibitor's Stand. The name of the person for whom each Ticket is intended must be written on it before it is used. Each person holding a Free Ticket of Admission must sign his or her name *Tickets to be filled up and signed.*

Tickets not Transferable. Improper use of Tickets.

on the back thereof, and must also, when required, sign his or her name in the book at the Entrance Gate. Exhibitor's attendants are strictly cautioned not to lend or transfer their Tickets, which can be used only by the persons whose names they bear, and who must be *bona fide* acting for, or employed by, the Exhibitor. No ticket is transferable. An Exhibitor is liable to a fine of £1 for each case of transfer or other improper use of a Ticket issued to himself or employee.

Admission of Supplies for Stand-holders.

100. The following are the arrangements for the admission of Supplies (Refreshments or other goods) for Stand-holders during the Show: Messenger on foot (with or without hand-barrow), with supplies, admitted by Special Ticket; price for one admission, 2s., for six admissions, 10s. Motor or horse vehicle and driver, with supplies, admitted by Special Ticket; price for one admission, 2s. 6d., for six admissions, 12s. These Special Tickets may be had from the Secretary. Vehicles, with supplies, will be admitted to the Showyard only between *Seven o'clock and Nine o'clock*, on each morning of the Show, except by written permit from the Secretary.

Vehicles, with a carrying capacity of more than 2 tons, will not be admitted to the Showyard at any time, except by special permit from the Secretary.

Cycles.

101. The riding of Cycles in the Showyard is prohibited.

Accidents.

102. The Society will not be responsible for any accident that may occur from the machinery belonging to any Exhibitor; and it is a condition of entry that each Exhibitor shall hold the Society harmless, and indemnify it against any legal proceedings arising from any accident caused by his machinery.

Alcoholic Drinks.

103. The giving of Alcoholic Drinks to visitors at Stands in the Show is strictly prohibited. With a view to the enforcement of this rule the Society reserves the right of unrestricted access, by its authorised representative, to all Exhibitors' Stands during the Show.

Gas and Electric Power.

104. Exhibitors desiring the use of gas in the Showyard should apply to the Manager, Gas Works, Glasgow, and those desiring electric power should apply to the Manager, Electric Supply Works, Glasgow, not later than 12th May.

Space for Stands.

105. * Ground to be taken in spaces of 10 feet frontage by 20 feet deep, and in Motion Yard in spaces of 10 feet frontage by 50 feet deep. Exhibitors must take their space in one or other of the following Sections. Space is not let partly covered and partly open.

Exhibits not in Motion.

Exhibits not in motion may be excluded from the Motion Yard. The space in the Motion Yard being limited in extent, and intended mainly for exhibits in motion, not more than one-fifth of the space allotted to any one Exhibitor—and in no case more than 600 square feet—may be occupied in the Motion Yard by exhibits not in motion.

Maximum Space.

106. The maximum extent of space which any one Exhibitor may apply for shall be 60 feet of frontage in the Motion Yard, and 120 feet of frontage in the other Sections.

Allocation of space.

107. The Society reserves the right to allot to applicants for Stands either the whole or part of the space they ask for.

Fitting up of Stands.

108. Exhibitors requiring work executed in connection with the fitting up of Stands allotted to them must employ the Society's Showyard Erector—Mr John Reid, 55 Blenheim Place, Aberdeen. The execution of orders received later than one week before the opening of the Show cannot be guaranteed.

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* Special provision may be made for Exhibitors of both machinery in motion and implements and machinery not in motion on application being made to the Secretary.

109. Rates for space, payable by Exhibitors when making their Entries :—

	Members.	Non-Members.
1. Open ground without Shedding, 20 ft. deep, per 10 ft. frontage	£1 10 0	£2 5 0
2. Special open ground, without Shedding, 20 ft. deep, per 10 ft. frontage	2 10 0	3 5 0
3. Ordinary Shedding, 20 ft. deep, 7 ft. to eave, per 10 ft. frontage	1 10 0	2 5 0
4. Special Shedding, 20 ft. deep, 7 ft. to eave, per 10 ft. frontage	2 10 0	3 5 0
5. Ordinary Shedding, 20 ft. deep, 7 ft. to eave, *close boarded at back*, per 10 ft. frontage	3 0 0	4 0 0
6. Special Shedding, 20 ft. deep, 7 ft. to eave, *close boarded at back*, per 10 ft. frontage	4 10 0	5 10 0
7. †Motion Yard, without Shedding, 50 ft. deep, per 10 ft. frontage	3 0 0	4 15 0
8. †Motion Yard, with Shedding (10 ft. open behind, 20 ft. covered, and 20 ft. *open in front*), 11 ft. to eave, per 10 ft. frontage	4 10 0	6 0 0
9. Special Section for Motor Vehicles, 30 ft. deep (20 ft. covered and 10 ft. *open in front*), 11 ft. to eave, per 10 ft. frontage	4 10 0	5 10 0
10. Covered Booths for offices, 9 ft. by 9 ft., each	5 0 0	7 0 0
11. Press offices, 9 ft. by 9 ft., each £4.		

† See Rules 105 and 106.

Tents and marquees not allowed in the Showyard. All internal fittings to be executed by the Exhibitor at his own expense. The Society's Showyard Erector must be employed. See Rule 108.

HORTICULTURAL SECTION.

See also Regulations 80 to 108.

Judges: J. S. Campbell—Floral Exhibits and Flowering Plants.
Andrew Harley—Formal or Rock Gardens, Rock Plants, and Alpines.

1. Exhibits in this section may comprise collections of flowers, fruits, plants, or shrubs, formal gardens, and rock gardens.

2. The Society will award six Gold Medals—one for best formal or rock garden; one for best collection of rock plants and alpines; and the remaining four for exhibits of outstanding merit in the other sections, on condition that two Medals shall not be awarded to exhibits of similar type. Silver Medals, not exceeding six in number, will be offered for other exhibits of outstanding merit.

3. Application for space, for which no stand rent or entry fee is payable, must be made on special entry forms, to be obtained from the Secretary and lodged on or before 21st April. Entry forms must give full details of each exhibit and the amount of space required. Space, which may be either covered or open, will be allocated in sections of 10 feet each, with a depth of 20 feet, and a maximum of 60 feet frontage for one exhibitor. For space without shedding special consideration will be given to applications from exhibitors desiring a greater depth than 20 feet. Staging will be provided free of charge.

4. The Society reserves the right to refuse any application for space, or to limit the amount of space to be allocated to any exhibitor.

5. Each exhibitor shall receive one exhibitor's ticket and two attendants' tickets for each 10 feet of frontage. Additional attendants' tickets, not more than three for each 10 feet of frontage, and in no case exceeding a maximum of twenty, may be purchased at a price of 5s. each. *No tickets will be issued without an order.*

6. All exhibits must be in position not later than 5 P.M. on Monday, 18th June, with the exception of cut flowers, which may be staged up till 8 A.M. on Tuesday, 19th June. Judging will commence at 9.30 A.M. on Tuesday. Stands must remain open until the Show closes on each of the four days.

NEW IMPLEMENTS.

1. Entries of New Implements for the Society's Silver Medal must be made on or before 2nd April. Entries shall be made on a special form obtainable from the Secretary, and must define clearly the exact nature of the novelty which qualifies such implement to be entered for a Medal. Unless the "New Implement" be properly described in the specification, and particulars of its novelty are given at the time of making the entry, it will not be accepted.

2. For each entry of a "New Implement," a non-returnable Entry Fee of £1 will be charged.

3. In cases of sufficient merit, the Judges will recommend the award of the Society's Silver Medal to New Implements for agricultural or estate purposes, or to new improvements in such implements.

4. The Society does not bind itself to try in the field every "New Implement" entered for a Silver Medal, but in general a practical trial will be required before an award is made. The Judges shall report to the Directors those cases in which they consider a practical trial necessary.

5. Where intimation is received by the Secretary, not later than the 23rd April, that a "New Implement" is ready for trial, the Directors may arrange for a practical trial before the Show at a place and date to be decided upon. In other cases the practical trial of New Implements will take place after the Show.

6. Any Exhibitor who expresses a wish to do so can, with the sanction of the Steward of Implements, at his own expense take his New Implement out of the Showyard during the Show week and put it to work, and, if within a reasonable distance, the Judges will, if they deem it necessary, inspect it at work and decide if it is worthy of a Silver Medal.

7. No Silver Medals will be awarded to, nor can any entry as New Implements be accepted of, machines of any class for which competitive trials have been announced by the Society as about to take place.

8. The Judges of New Implements will commence their inspection at 2.30 P.M. on Monday, 18th June, and will take in rotation the stands of the Exhibitors who have entered New Implements for the Society's Silver Medals. Each Exhibitor, or his representative, will be expected to be at the stand to explain the working of the Implement to the Judges. If the exhibit be not ready and in working order by the time the Judges make their inspection, it is liable to be struck off the list.

9. All publications by Exhibitors of the award of the Society's Silver Medals must state the year of the award, and must specify the exact nature of the "New Implement," of the improvement, or of the attachment to an Implement, for which the Silver Medal has been awarded.

10. On the recommendation of the Judges, with the approval of the Directors, any New Implement of merit, which cannot be sufficiently tried, or which is capable of further development, may be entered and exhibited as a "New Implement" at the succeeding Show of the Society.

11. The Judges' decision, when duly accepted and recorded, will in all cases be final.

RESERVED SEATS (NUMBERED) IN GRAND STAND.

For Charges and Tickets, apply to Secretary up to opening day of Show. Thereafter tickets are sold only in the Showyard at the Booking-office behind the Grand Stand.

ADMISSION OF THE PUBLIC.

The public will be admitted daily at 8 A.M. Judging begins on Tuesday at 9.30 A.M. The charges for admission to the Yard will be —**Tuesday**, from 8 A.M. till 5 P.M., 7s. 6d. **Wednesday**, from 8 A.M. till 5 P.M., 5s.; from 5 P.M. to 8 P.M., 2s. 6d. **Thursday**, from 8 A.M. till 5 P.M., 2s. 6d.; from 5 P.M. till 8 P.M., 1s. **Friday**, from 8 A.M. till 5 P.M., 1s.

On **Thursday** and **Friday** children under twelve years of age admitted at 6d.

No Pass-out Checks given, and no re-admission without payment.

Season Tickets—12s. 6d. each (children under 12 years of age, 5s. each)—on application to Secretary. On the days of the Show, Season Tickets are sold only at the Entrance Gates.

ADMISSION OF MEMBERS AND EXHIBITORS.

On exhibiting their "*Member's Badge*," which is strictly not transferable, Members of the Society are admitted free to the Showyard. Badges will be sent to all Members residing in Great Britain, Northern Ireland, and Irish Free State, whose addresses are known, and on no account will duplicates be issued. **All Members not producing their badges must pay at the gates, and the admission money will not on any account be returned.** Badges must be signed by Members before being presented at the gate, and Members should continue to wear the badge during the whole time that they are in the Showyard.

Tickets of admission to the Showyard are sent to Exhibitors of Stock, Poultry, Dairy Produce, &c. (not Members), whose Entry Fees amount to not less than 12s. 6d.

For Exhibitors of Implements and their assistants tickets are issued as provided in the Regulations for Implements.

VARIOUS.

Exhibitors may display their own Placards *inside and in front of* their stands; with this exception, no Bills of any kind other than those of the Society are permitted on any of the Show erections. No newspapers or any other articles to be carried about the Yard for sale or display.

No Carriages or Equestrians admitted without special leave from the Directors, and then only for Invalids. Bath-chairs may be brought in.

Premium Lists, Regulations, and Certificates of Entry may be obtained by applying at the Secretary's Office, No. 8 Eglinton Crescent, Edinburgh 12.

All Communications should be addressed to the Secretary of the Highland and Agricultural Society of Scotland, No. 8 *Eglinton Crescent, Edinburgh* 12. *From* 12*th to* 21*st June, to the Secretary's Office, Showyard, Bellahouston Park, Glasgow.*

Address for Telegrams—"SOCIETY," EDINBURGH.

Telephone No.—**EDINBURGH, 23655.**

RAILWAY ARRANGEMENTS.

The Railway Companies will be furnished with a list of the Exhibitors of Stock and Implements, after the 29th May. All applications for horse-boxes and trucks, and for information as to train arrangements, must be made by the Exhibitors themselves to the Stationmaster where their stock is to be trucked.

The arrangements made by the Railway Companies for the conveyance of Live Stock and Goods to and from the Show are indicated *below, but Exhibitors are recommended to apply to the respective Companies for* full particulars :—

1. Live Stock, Agricultural Machines, Implements, and other exhibits *to* the Show to be charged ordinary rates.

2. Live Stock, Agricultural Machines, Implements, and other exhibits *from* the Show, if sold, to be charged ordinary rates.

3. Live Stock from the Show, if unsold, and returned not later than the second day after the closing day of the Show (excluding Sunday), to be carried at half rates back to the Station whence the animals were sent, at owner's risk, on surrender of a Certificate from the Exhibitor, provided in accordance with the Railway Companies' requirements, and signed by the Secretary, to the effect that they are really unsold; failing surrender of such Certificate, ordinary rates will be charged. The reduction to half rates is to be allowed only when the Stock are consigned to be returned by the same route as that by which they were conveyed to the Show, but it shall be in the option of the Railway Company or Companies to return the Stock at half rates by a different route. Minimum charge for Stock returning at half rates to be one-half the ordinary minimum.

4. Live Poultry from the Show, *if unsold,* to be carried by Passenger Train at half rates back to the Station from which sent, at O.R., on surrender of an agreed Certificate signed by the Secretary of the Show to the effect that the Poultry are unsold and remain the property of the Exhibitor. No Certificate will be required for such traffic, which is intended by the owner to be returned from the Show to the original sending Stations by the same route as originally forwarded and the charges prepaid for both the outward and return journeys. (Poultry to be charged ordinary rates both ways when conveyed by Goods Train.)

Poultry are only charged at the half rate when returned not later than the second day after the closing of the Show (Sunday being treated as a *dies non*).

5. Horse-boxes, or other Passenger Train vehicle, will not be provided for the carriage of Live Stock sent by Goods Train and invoiced at Goods Train rates. *For rates for Horse-boxes by Passenger and Special Trains, apply to the Railway Companies.*

6. Provender conveyed to and from Agricultural Shows in the same vehicle as Live Stock will be charged at the applicable rates, subject to a free weight allowance, viz.—

Cattle	per animal,	56 lb.
Horses	,,	56 ,,
Sheep, goats, lambs, pigs, and calves .	,,	28 ,,

7. The carriage of all Live Stock, Implements, and other articles going to the Show for exhibition must be PREPAID; and the carriage on all traffic *returned from the Show by Passenger Train Service must be PREPAID.*

The carriage charges on Live Stock conveyed in special vehicles by Passenger Train and intended to be returned to the original sending Station may also be prepaid for the return journey at the original sending Station if the owner so desires.

The Railway Charge on all exhibits which are conveyed by Passenger Train in the Guard's Van and intended to be returned from the Show direct to the original sending Station by the same route must be PREPAID, for both the outward and return journeys, at the original sending Station. The agreed form of address label for Poultry, Rabbits, Dairy Produce, Eggs, Bee Appliances, and Rural Industries exhibits, which will be supplied through the Secretary of the Society, must be used in such cases.

8. Attendants in charge of Live Stock are conveyed free in the cases shown below, when certified by the owners to be *bona fide* in charge of such Live Stock:—

In Horse-Boxes.—Horses and Cattle: One man for each consignment, except where the consignment requires more than one vehicle, when one man to each vehicle may be sent free; but where two or three Horses or Cattle forming one consignment are sent in the same Horse-box and a man is required to travel with each animal, a man for each animal may be conveyed free, provided each animal is charged for separately.

In Horse-Boxes.—Small animals: One man to each vehicle.

In specially constructed Cattle Trucks.—Cattle or other animals: One man to each vehicle.

9. Agricultural Machines, Implements and other Exhibits from the Show, *if unsold,* to be conveyed at half rates back to the Station whence they were sent, at Owner's risk, on production of a Certificate from the Exhibitor (provided and signed by the Show Secretary) to the effect that they are unsold; failing production of such Certificate, ordinary rates must be charged. The reduction to half rates is to be allowed only when the articles are returned by the same route as that by which they were conveyed to the Show, but it shall be in the option of the Railway Company or Companies to return the articles at half rates by a different route. This applies only to Goods Train Traffic.

10. Unsold articles, previously carried by railway, transferred from one Show to another, or exhibited at several Shows consecutively, and returned to the Station from whence originally sent, will be conveyed at half rates at Owner's risk, on production of a Certificate from the Exhibitor (provided and signed by the Show Secretary) to the effect that they are unsold; failing production of such Certificate, ordinary rates will be charged. This applies only to Goods Train Traffic.

11. Unsold Live Stock transferred from one Show to another will be charged ordinary rates.

12. The ordinary rates charged for carriage do not in any case include delivery *to*, or collection *from*, the Showground.

13. Agricultural Societies' Show Plant must be charged at Class 10 rates, Station to Station.

14. Tents, Canvas, Show Stands, and other articles not for exhibition—

(*a*) When the property of Exhibitors, to be charged half the ordinary rate at Owner's risk from Show to Show, and on return from the Show to the Station from whence originally despatched.

(*b*) When not the property of Exhibitors, to be charged the ordinary rates both going to and returning from Show.

15. Carriages and other Road Vehicles are only conveyed by Passenger Train when this can be conveniently done.

DELIVERY AND COLLECTION CHARGES.

Cartage Charges to be paid by the Exhibitor for the Delivery or Collection of traffic between the Railway Stations at Glasgow and the Showground of the Highland and Agricultural Society's Show at Bellahouston Park, Glasgow, on 19th, 20th, 21st, and 22nd June.

General traffic	5s. per ton.
Minimum charge per consignment .	2s. 6d.
Implements and Machinery (Agricultural), not exceeding 1 ton each .	5s. per ton.
Minimum charge per delivery . .	2s. 6d.
Implements and Machinery (Agricultural) on their own wheels (specially hauled), not exceeding 1 ton .	7s. 6d. each.
When hauled on their own wheels behind a Railway Company's lorry, loaded or partly loaded with goods, actual weight at	5s. per ton.
Single articles, exceeding 1 ton but not exceeding 3 tons . . .	8s. per ton.
Single articles, exceeding 3 tons but not exceeding 5 tons . . .	9s. 6d. per ton.
Single articles, exceeding 5 tons, by special arrangement only, but no less charge than	11s. 9d. per ton.
Railway containers (net weight of contents)	8s. per ton.
Minimum charge	8s.
Loaded vans on their own wheels exceeding 1 ton but not exceeding 3	8s. per ton.
Loaded vans on their own wheels exceeding 3 tons but not exceeding 5	9s. 6d. per ton.
Loaded vans on their own wheels exceeding 5 tons, by special arrangement only, but no less charge than	11s. 9d. per ton.
Rustic Houses, by special arrangement only, but no less charge than .	14s. per load.
Carriages, on their own wheels . .	6s. each.
Carriages, if carried on Railway Company's lorries	7s. 6d. per ton.
Minimum charge per consignment .	7s. 6d.
Cattle, in floats	4s. per head.
Minimum charge for each float .	7s.
Sheep, Goats, and Pigs, in floats .	1s. 6d. per head.
Minimum charge for each float .	7s.
Pigs, in crates	3s. per crate.
Minimum charge per load . .	6s.
Ordinary Parcels by passenger train .	6d. each.
Miscellaneous passenger train traffic, including packages of plants and flowers carried at O.R. rates S. to S.	9d. per cwt.
Minimum charge per consignment .	1s. 6d.
*Poultry, in crates or hampers . .	9d. per crate or hamper.
*Rabbits, in crates, hampers, &c. .	
Cartage from point to point inside the Showground	3s. per hour.
Minimum charge	3s.

* **Poultry and Rabbit exhibits only** will be conveyed at the Society's expense from the Railway Station to the Showyard and back, but no exhibit subject to railway charges will be received by the Society. All other delivery charges must be paid by the Exhibitor

THE PRESIDENT'S CHAMPION MEDALS

A Champion Medal is given by the Earl of Home, K.T., President of the Society, for the *best Animal* in each of the following sections:—

1. **Shorthorn.**
2. **Aberdeen-Angus.**
3. **Galloway.**
4. **Belted Galloway.**
5. **Highland.**
6. **Ayrshire.**
7. **British Friesian.**
8. **Red Poll.**
9. **Fat Cattle.**
10. **Dairy Cow.**
11. **Clydesdale Stallion or Colt.**
12. **Clydesdale Gelding.**
13. **Clydesdale Mare or Filly.**
14. **Hunter.**
15. **Highland or Western Island Pony.**
16. **Shetland Pony.**
17. **Hackney in Harness.**
18. **Blackface Sheep.**
19. **Cheviot.**
20. **Border Leicester.**
21. **Half-Bred.**
22. **Oxford Down.**
23. **Suffolk.**
24. **Dorset Horn.**
25. **Fat Sheep.**
26. **Goat.**
27. **Large White Pig.**
28. **Large Black.**

NOTE.—*Animals entered as Extra Stock may compete for these Medals. Former Winners of the President's Medals are eligible. The Society shall have the right to photograph the Winners for publication in the 'Transactions.' At this Show no animal can be awarded more than one of these Medals.*

*CATTLE

SHORTHORN

Judges: Sylvester Campbell; G. Masson

President's Champion Medal for best Shorthorn Animal

ENTRY FEES		*CLASS*		*PREMIUMS*			
Members	*Non-Members*			*First*	*Second*	*Third*	*Fourth*
				£	£	£	£
25/-	45/-	1	**Bull** born before 1st December 1931 . .	15	10	5	3
25/-	45/-	2	**Bull** born on or after 1st December 1931 and before 1st April 1932	15	10	5	3
25/-	45/-	3	**Bull** born on or after 1st April 1932 and before 1st December 1932	12	8	4	2
25/-	45/-	4	**Bull** born on or after 1st December 1932 and before 1st April 1933	12	8	4	2
25/-	45/-	5	**Bull** born on or after 1st April 1933. . .	10	6	4	2
25/-	45/-	6	**Cow** in Milk, born before 1st December 1930 .	12	8	4	2
25/-	45/-	7	**Cow** in Milk, born on or after 1st December 1930 and before 1st December 1931 . . .	10	5	3	2
25/-	45/-	8	**Cow** or **Heifer** born on or after 1st December 1931 and before 1st December 1932 . . .	10	5	3	2
25/-	45/-	9	**Heifer** born on or after 1st December 1932 and before 1st April 1933	10	5	3	2
25/-	45/-	10	**Heifer** born on or after 1st April 1933 . .	10	5	3	2

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* See Rules 32 and 33.

ENTRY FEES		*CLASS*		*PREMIUMS*			
Members	*Non-Members*		CATTLE	*First*	*Second*	*Third*	*Fourth*
			SHORTHORN—continued	£	£	£	£
			[1] **The Duthie Perpetual Challenge Cup,** value £150, for best Animal in the Shorthorn Classes, "Extra Stock" being eligible to compete.				
			[2] **Silver Cup,** value £50, for the best group of three animals in the Shorthorn Classes, consisting of one Bull and two Females, "Extra Stock" eligible to compete. The Cup to become the property of an Exhibitor who shall win it three times, not necessarily in succession.,				
			[3] **The Emilio R. Casares, jun., "Junior Memorial Champion Cup,"** value 50 guineas, for best Shorthorn Bull in Class 5, calved on or after 1st April of the year preceding the Show, that has passed the tuberculin test.				
			[4] **Best Shorthorn Bull in the Show,** entered or eligible for entry in Coates's Herd-Book—£20.				
			[4] **Silver Medal** to the Breeder of the winner of above Prize.				
			Breeder of best Bull of any age in the five Classes ("Extra Stock" not eligible to compete)—The Silver Medal.				
			[4] **Best Shorthorn Female in the Show,** entered or eligible for entry in Coates's Herd-Book—£20.				
			[4] **Silver Medal** to the Breeder of the winner of above Prize.				
			PRIZE MONEY BY SOCIETY . . £246				
			CONTRIBUTED 40				

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[1] This Cup was gifted by the late Mr William Duthie, Collynie. The Cup may not be won on more than one occasion with the same animal. The animal winning the Cup must be certified free from hereditary disease. The winner of the Cup shall, before delivery thereof is made to him, give security to the Society that he shall surrender the same to the Society and deliver it at the Society's office when called upon to do so. The winner of the Cup on each occasion will receive a miniature replica as a memento of his winning the Cup.

[2] Given by Mr William M'Nair Snadden, The Coldoch, Blair Drummond, Stirling.

[3] Given by Messrs J. Baird & Co. (Falkirk) Ltd., Bantaskin, Falkirk. This Cup will become the property of the Exhibitor who shall win it three times, not necessarily in succession.

[4] Given by the Shorthorn Society.

CATTLE

ABERDEEN-ANGUS

Judges : W. G. Macpherson ; James L. Whyte

President's Champion Medal for best Aberdeen-Angus Animal

ENTRY FEES		CLASS		PREMIUMS			
Members	Non-Members			First £	Second £	Third £	Fourth £
25/-	45/-	11	**Bull** born before 1st December 1931	15	10	5	3
25/-	45/-	12	**Bull** born on or after 1st December 1931 and before 1st December 1932	15	10	5	3
25/-	45/-	13	**Bull** born on or after 1st December 1932 and before 1st March 1933	12	8	4	2
25/-	45/-	14	**Bull** born on or after 1st March 1933	10	6	4	2
25/-	45/-	15	**Cow** in Milk, born before 1st December 1930	12	8	4	2
25/-	45/-	16	**Cow** in Milk, born on or after 1st December 1930 and before 1st December 1931	12	8	4	2
25/-	45/-	17	**Cow** or **Heifer** born on or after 1st December 1931 and before 1st December 1932	10	5	3	2
25/-	45/-	18	**Heifer** born on or after 1st December 1932 and before 1st March 1933	10	5	3	2
25/-	45/-	19	**Heifer** born on or after 1st March 1933	10	5	3	2

[1] **Silver Cup**, value £50, for best Group of Aberdeen-Angus Cattle, consisting of one Bull and two Females, "Extra Stock" eligible to compete. The Cup to become the property of an Exhibitor who shall win it three times, not necessarily in succession.

[2] **Ballindalloch Challenge Cup**, value £50, for the best Bull of any age in the four Classes.

[3] **Silver Cup**, value 50 guineas, for best Aberdeen-Angus Bull born on or after 1st December 1931, to become the property of an Exhibitor who shall win it three times, not necessarily in succession.

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[1] Given by Mr W. Gilchrist Macbeth of Dunira, Comrie. A Silver Medal will be given by the Society to the winner as a memento of his winning the Cup.

[2] "The Ballindalloch Challenge Cups," value £50 each, are offered for the best Bull of any age and best Cow of any age (Heifers excluded) in the Aberdeen-Angus Classes, the former presented by the late Sir George Macpherson Grant, Bart., and the latter by the late Sir John Macpherson Grant, Bart. Each Cup will become the property of the Exhibitor who shall win it five times, not necessarily in succession. The Exhibitor and Breeder of the successful animals each year will receive the Society's Silver Medal, with suitable inscription.

[3] Given by Senor Eduardo Estanguet, Argentina.

CATTLE

ABERDEEN-ANGUS—*continued*

ENTRY FEES		*CLASS*		*PREMIUMS*			
Members	*Non-Members*			*First*	*Second*	*Third*	*Fourth*
				£	£	£	£
			Breeder of best Bull of any age in the four Classes (" Extra Stock " not eligible to compete)—The Silver Medal.				
			Exhibitor of the Winner of the Ballindalloch Challenge Cup—The Silver Medal.				
			Breeder (if not also the Exhibitor) **of the Winner** of the Ballindalloch Challenge Cup—The Silver Medal.				
			[1] **Ballindalloch Challenge Cup,** value £50, for the best Cow of any age in Classes 15, 16, and 17.				
			Exhibitor of the Winner of the Ballindalloch Challenge Cup—The Silver Medal.				
			Breeder (if not also the Exhibitor) **of the Winner** of the Ballindalloch Challenge Cup—The Silver Medal.				
			[2] **Silver Cup,** value £50, for the best Female Animal of the Aberdeen-Angus breed, to become the property of an Exhibitor who shall win it four times, not necessarily in succession. "Extra Stock" eligible to compete.				
			[3] **Champion Gold Medal,** value £10, for best Animal in the Breeding Classes, breeding animals shown as "Extra Stock" eligible to compete.				
			PRIZE MONEY BY SOCIETY . £226				

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[1] "The Ballindalloch Challenge Cups," value £50 each, are offered for the best Bull of any age and best Cow of any age (Heifers excluded) in the Aberdeen-Angus Classes, the former presented by the late Sir George Macpherson Grant, Bart., and the latter by the late Sir John Macpherson Grant, Bart. Each Cup will become the property of the Exhibitor who shall win it five times, not necessarily in succession. The Exhibitor and Breeder of the successful animals each year will receive the Society's Silver Medal, with suitable inscription.

[2] Presented by Mr Falconer L. Wallace of Candacraig, Strathdon. A Silver Medal will be given by the Society to the winner as a memento of his winning the Cup.

[3] Given by the Aberdeen-Angus Cattle Society.

CATTLE

GALLOWAY

Judge: David Brown

President's Champion Medal for best Galloway Animal

ENTRY FEES		*CLASS*		*PREMIUMS*			
Members	*Non-Members*			*First*	*Second*	*Third*	*Fourth*
				£	£	£	£
25/-	45/-	20	**Bull** born before 1st December 1931	15	10	5	3
25/-	45/-	21	**Bull** born on or after 1st December 1931 and before 1st December 1932	15	10	5	3
25/-	45/-	22	**Bull** born on or after 1st December 1932	12	8	4	2
25/-	45/-	23	**Cow** in milk, born before 1st December 1930	12	8	4	2
25/-	45/-	24	**Cow** in Milk, born on or after 1st December 1930 and before 1st December 1931	12	8	4	2
25/-	45/-	25	**Cow** or **Heifer** born on or after 1st December 1931 and before 1st December 1932	10	5	3	2
25/-	45/-	26	**Heifer** born on or after 1st December 1932	10	5	3	2

[1] **Edinburgh Corporation Perpetual Gold Challenge Cup** for best Galloway Animal, "Extra Stock" eligible to compete.

[2] **Dr Gillespie Memorial Challenge Trophy,** value £50, for best Galloway Animal in the Breeding Classes, breeding animals shown as "Extra Stock" being eligible to compete—see conditions below.

[3] **Silver Challenge Cup,** value £50, for best animal of the sex opposite to that of the winner of the Dr Gillespie Memorial Challenge Trophy, "Extra Stock" being eligible to compete.

Breeder of best Bull of any age in the three Classes ("Extra Stock" not eligible to compete) —The Silver Medal.

PRIZE MONEY BY SOCIETY . £184

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[1] This Cup was presented by the City of Edinburgh to commemorate the Society's Hundredth Show. This year the Cup is offered for best Galloway animal. The winner of the Cup shall, before delivery thereof is made to him, give security to the Society that he shall surrender the same to the Society and deliver it at the Society's office when called upon to do so.

[2] This Trophy was presented by the Galloway Cattle Society of Great Britain and Ireland for the best Galloway animal registered in the Galloway Cattle Society's Herd-Book, entered in any of the breeding classes, at the Show at which it may be competed for. The winner of the Trophy shall, before delivery thereof is made to him, give security to the Society that he shall surrender the same to the Society and deliver it at the Society's office when called upon to do so. The winner on each occasion will receive the Galloway Cattle Society's Silver Medal as a memento of his winning the Trophy.

[3] This Cup was presented by the Galloway Cattle Society to commemorate the Hundredth Show of the Highland and Agricultural Society, to be awarded to best animal of the sex opposite to that of the winner of the Dr Gillespie Memorial Trophy registered in the Galloway Cattle Society's Herd-Book. The winner of the Cup shall, before delivery thereof is made to him, give security to the Society that he shall surrender the same to the Society and deliver it at the Society's office when called upon to do so.

CATTLE

BELTED GALLOWAY

Judge: John Gardiner

President's Champion Medal for best Belted Galloway Animal

ENTRY FEES		*CLASS*		*PREMIUMS*			
Members	*Non-Members*			*First*	*Second*	*Third*	*Fourth*
				£	£	£	£
25/-	45/-	27	**Bull** born before 1st December 1932 . .	10	5	3	2
25/-	45/-	28	**Bull** born on or after 1st December 1932 . .	10	5	3	2
25/-	45/-	29	**Cow or Heifer** born before 1st December 1931, in Milk or in Calf; if in calf and not in milk, to calve on or before 1st December of the year of the Show	10	5	3	2
25/-	45/-	30	**Heifer** born on or after 1st December 1931 and before 1st December 1932	10	5	3	2
25/-	45/-	31	**Heifer** born on or after 1st December 1932 . .	10	5	3	2
			[1] **Knockbrex Challenge Cup**, value £50, for the best Belted Galloway Animal, "Extra Stock" eligible to compete.				
			[2] **The Ian Hamilton Silver Challenge Cup**, value £50, for the best Belted Galloway Animal of the sex opposite to that of the winner of the Knockbrex Challenge Cup, "Extra Stock" eligible to compete: The winning animal to be registered or eligible for registration in the Dun and Belted Galloway Herd-Book.				
			[3] **Special Prizes** for Groups of Belted Galloway Animals consisting of one Bull and two Females, "Extra Stock" eligible to compete. . .	10	7	3	–
			Special Prizes for Cows from Grade "A" (Tuberculin Tested) or Certified Herds, drawn from Classes 29, 39, 40, 41, 48, 49, 50, 57, and 65. (*See page* 119.)				
			PRIZE MONEY BY SOCIETY . . £100				
			[3] CONTRIBUTED 20				

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[1] This Cup was presented by Mrs Brown, Kirkbrex, Glasgow, for the best Belted Galloway animal registered in the Dun and Belted Galloway Cattle Breeders' Association Herd-Book, entered in any of the breeding classes, at the Show at which it may be competed for. The winner of the Trophy shall, before delivery thereof is made to him, give security to the Society that he shall surrender the same to the Society and deliver it at the Society's office when called upon to do so. The winner on each occasion will receive a Silver Medal as a memento of his winning the Trophy.

[2] This Cup was presented by General Sir Ian Hamilton, G.C.B. The winner of the Trophy shall, before delivery thereof is made to him, give security to the Society that he shall surrender the same to the Society and deliver it at the Society's office when called upon to do so.

[3] Given by Miss Monica M. M'Laren.

CATTLE

HIGHLAND

Judge: Michael G. M'Diarmid

President's Champion Medal for best Highland Animal

Entry Fees *Members*	*Entry Fees* *Non-Members*	*Class*		*Premiums* *First* £	*Second* £	*Third* £	*Fourth* £
25/-	45/-	32	**Bull** born before 1st December 1931	15	10	5	3
25/-	45/-	33	**Bull** born on or after 1st December 1931 and before 1st December 1932	15	10	5	3
25/-	45/-	34	**Bull** born on or after 1st December 1932	12	8	4	2
25/-	45/-	35	**Cow** of any age with Calf at foot	12	8	4	2
25/-	45/-	36	**Heifer** born on or after 1st December 1930 and before 1st December 1931	10	5	3	2
25/-	45/-	37	**Heifer** born on or after 1st December 1931 and before 1st December 1932	10	5	3	2
25/-	45/-	38	**Heifer** born on or after 1st December 1932	10	5	3	2

[1] **Dundee Citizens' Perpetual Silver Challenge Cup,** value about £50, for the best Animal in the Highland Cattle Classes, "Extra Stock" eligible to compete.

[2] **Perpetual Victory Challenge Cup,** approximate value 50 Guineas, for the best Animal in the Male Classes, "Extra Stock" eligible to compete.

Breeder of best Bull in Classes 32, 33, and 34 ("Extra Stock" not eligible to compete)—The Silver Medal.

[2] **Perpetual Victory Challenge Cup,** approximate value 35 Guineas, for the best Animal in the Female Classes, "Extra Stock" eligible to compete.

PRIZE MONEY BY SOCIETY . . £178

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[1] This Cup was presented by the Citizens of Dundee to commemorate the holding of the Society's Annual Show at Dundee in 1933. On this occasion the Cup is offered for the best Highland Animal. The animal winning the Cup must be certified free from hereditary disease. The winner of the Cup shall, before delivery thereof is made to him, give security to the Society that he shall surrender same to the Society, and deliver it at the Society's office when called upon to do so. The winner on each occasion will receive a Medal as a memento of his winning the Trophy.

[2] Given by the Highland Cattle Society of Scotland.

CATTLE

AYRSHIRE

Judges: W. L. Ferguson; George Templeton

1. To be eligible for competition in the Ayrshire Section Cows must have an authenticated Milk Yield, and younger Females (including Cows which have not completed their first lactation) and Bulls an authenticated Milking Pedigree, of a definite minimum amount.

2. The minimum amount referred to shall be as follows, calculated on the basis of a period between calvings of 52 weeks, and 3·8 per cent of butter fat:—

(a) Cows which have completed two or more lactations—700 gallons.

(b) Cows which have completed only one lactation—600 gallons.

(c) Younger Females and Bulls—an authenticated Milking Pedigree for dam and dam of sire on a similar basis.

3. In the case of Cows with two or more lactations the record lodged may be that for any year the Exhibitor may select.

4. In the case of a Cow which has no milking pedigree, and which has not completed her first lactation at date of entry, but is likely to calve again before date of Show, such Cow may be provisionally entered on her own milk yield produced within forty weeks after first calving, but when the Cow has calved again a further Certificate in terms of the Rules must be obtained and produced before the Cow is allowed to enter the judging ring. The latter Certificate is the standard of qualification, and failure to produce such will render the Cow liable to disqualification, and no entry money will be returned.

5. The evidence of Milk Yield and Milking Pedigree shall be in the form of a Certificate signed by the Secretary of the Scottish Milk Records Association. The Certificate, besides giving the actual yields, shall give these calculated on a uniform basis of a period of 52 weeks between calvings, and 3·8 per cent butter fat. This latter figure shall be communicated to the Judges before adjudicating.

In the case of an Exhibitor founding on the Milk Yield of any animal, or animals, made in England, said Exhibitor must forward a Certificate of Milk Yield from the Secretary of the County Milk Recording Society in which the Exhibitor resides, together with a Certificate from a competent analyst, stating that a butter-fat test had been made at least once every 28 days during the period of lactation, and with details of said butter-fat tests attached, to the Secretary of the Scottish Milk Records Association, who has undertaken to check the records and to certify same.

6. The authenticated Milk Yields and authenticated Milking Pedigrees shall appear in the Catalogue.

N.B.—**Certificates above referred to must be obtained from Mr John Howie, 58 Alloway Street, Ayr, and lodged with Entries.**

President's Champion Medal for best Ayrshire Animal

ENTRY FEES Members	ENTRY FEES Non-Members	CLASS		PREMIUMS First £	PREMIUMS Second £	PREMIUMS Third £
25/-	45/-	39	[1] **Cow** in Milk,* born before 1931	12	8	4
25/-	45/-	40	[1] **Cow** in Milk,* born on or after 1st January 1931 .	10	7	3
25/-	45/-	41	[1] **Cow** of any age in Calf,* and due to calve before 1st December of the year of the Show . .	10	7	3
25/-	45/-	42	**Heifer** * born on or after 1st June 1931, in Calf and due to calve before 1st December of the year of the Show	10	7	3
25/-	45/-	43	**Heifer** * born in 1932	10	5	3
25/-	45/-	44	**Heifer** born in 1933	8	5	3

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[1] Cows in these Classes must have produced a calf within fifteen months prior to the Show.

* See Rules 33, 42 and 72.

CATTLE

AYRSHIRE—*continued*

ENTRY FEES		*CLASS*		*PREMIUMS*		
Members	*Non-Members*			*First*	*Second*	*Third*
				£	£	£
25/-	45/-	45	Bull born before 1932	12	8	4
25/-	45/-	46	Bull born in 1932	10	7	3
25/-	45/-	47	Bull born in 1933	8	5	3

[1] **Paisley Perpetual Gold Challenge Cup,** value £300, for best Ayrshire Animal, "Extra Stock" eligible to compete.

[2] **Cowhill Champion Cup,** approximate value £30, for best Animal of the Ayrshire breed, entered with a number in the Herd-Book. The Cup to be won three times, not necessarily in succession, by the same person with different animals, before becoming the property of the winner. No animal which has already won the Cup shall be eligible to compete.

[3] **Special Prize of £10** for the best Female Animal of the Ayrshire breed entered with a number in the Ayrshire Cattle Herd-Book prior to 1st June 1934. "Extra Stock" eligible to compete.

Breeder of best Bull of any age in Classes 45, 46, and 47 ("Extra Stock" not eligible to compete) —The Silver Medal.

[3] **Special Prize of £10** for the best Male Animal of the Ayrshire breed entered with a number in the Ayrshire Cattle Herd-Book prior to 1st June 1934. "Extra Stock" eligible to compete.

Special Prizes for Cows from Grade "A" (Tuberculin Tested) or Certified Herds, drawn from Classes 29, 39, 40, 41, 48, 49, 50, 57, and 65. (*See page* 119.)

PRIZE MONEY BY SOCIETY . . £178
CONTRIBUTED 20

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[1] This Cup, along with an endowment of £600, was provided from money collected in Paisley by the late Provost Muir M'Kean, and is in commemoration of the Society's first Show at Paisley in 1913. This year the Cup is offered for the best Ayrshire animal. The animal winning the Cup must be certified free from hereditary disease. The winner of the Cup shall, before delivery thereof is made to him, give security to the Society that he shall surrender the same to the Society and deliver it at the Society's office when called upon to do so. The winner of the Cup on each occasion will receive a miniature replica in silver as a memento of his winning the Cup.

[2] Presented by the late Major Henry Keswick, Cowhill Tower, Dumfries, to the Ayrshire Cattle Herd-Book Society, to be competed for annually at the Shows of the Highland and Agricultural Society of Scotland.

[3] Given by the Ayrshire Cattle Herd-Book Society.

CATTLE

BRITISH FRIESIAN

Judges: D. A. MacLennan; Albert Weightman

President's Champion Medal for best British Friesian Animal

ENTRY FEES				*PREMIUMS*			
Members	*Non-Members*	*CLASS*		*First*	*Second*	*Third*	*Fourth*
				£	£	£	£
25/-	45/-	48	[1] **Cow** in Milk,* born in or before 1930	12	8	4	2
25/-	45/-	49	[1] **Cow** in Calf,* and not in Milk, born in or before 1930	10	5	3	2
25/-	45/-	50	[1] **Cow** in Milk,* born in 1931 or 1932	10	5	3	2
25/-	45/-	51	**Heifer** * born in 1932	10	5	3	2
25/-	45/-	52	**Heifer** born in 1933, before 1st July	10	5	3	2
25/-	45/-	53	**Heifer** born in 1933, on or after 1st July	10	5	3	2
25/-	45/-	54	**Bull** born in or before 1931	12	8	4	2
25/-	45/-	55	**Bull** born in 1932	10	5	3	2
25/-	45/-	56	**Bull** born in 1933	10	5	3	2

[2] **Fife and Kinross Perpetual Gold Challenge Cup,** value £200, for best British Friesian Animal. "Extra Stock" eligible to compete.

[3] **The MacRobert Champion Silver Bell,** value 50 Guineas, for the best Animal in the British Friesian Classes, registered in or eligible for entry in the British Friesian Cattle Society's Herd-Book. "Extra Stock" eligible to compete.

[4] **Silver Challenge Cup,** value 50 guineas, for the best Group of three animals. The Cup to become the property of an Exhibitor winning it three times, not necessarily in succession. "Extra Stock" eligible to compete.

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* See Rules 33, 42, and 72.

[1] Cows in these Classes must have produced a calf within fifteen months prior to the Show.

[2] This Cup, along with an endowment of £400, was subscribed for by the Counties of Fife and Kinross in commemoration of the Society's first Show at Cupar-Fife in 1912. This year the Cup is offered for the best British Friesian Animal. The animal winning the Cup must be certified free from hereditary disease. The winner of the Cup shall, before delivery thereof is made to him, give security to the Society that he shall surrender the same to the Society and deliver it at the Society's office when called upon to do so. The winner of the Cup on each occasion will receive a miniature replica in silver as a memento of his winning the Cup.

[3] Presented by Lady Rachel Workman MacRobert, Douneside, Tarland. This Bell will become the property of the Exhibitor who shall win it three times, not necessarily in succession. The winner of the Bell on each occasion will receive a miniature replica in silver as a memento of winning the Bell. The Breeder of the winning animal will also receive a replica, provided he or she is not also the Exhibitor.

[4] Given by the British Friesian Cattle Society.

CATTLE

BRITISH FRIESIAN—*continued.*

ENTRY FEES		*CLASS*		*PREMIUMS*		
Members	*Non-Members*			*First*	*Second*	*Third*
				£	£	£
			Champion Prize of £5 given by the British Friesian Cattle Society for the best Female exhibited. "Extra Stock" eligible to compete.			
			Breeder of Best Bull of any age in Classes 54, 55, and 56 ("Extra Stock" not eligible to compete)—The Silver Medal.			
			Champion Prize of £5 given by the British Friesian Cattle Society for the best Male exhibited. "Extra Stock" eligible to compete.			
			Special Prizes for Cows from Grade "A" (Tuberculin Tested) or Certified Herds, drawn from Classes 29, 39, 40, 41, 48, 49, 50, 57, and 65. (*See page* 119.)			

PRIZE MONEY BY SOCIETY . .	£152
[1] CONTRIBUTED	50

Given by the British Friesian Cattle Society.

CATTLE

RED POLL

Judge: W. P. Bailey

President's Champion Medal for best Red Poll Animal

Entry Fees		*Class*		*Premiums*		
Members	*Non-Members*			*First*	*Second*	*Third*
				£	£	£
25/-	45/-	57	[1] **Cow** in Milk or in Calf, born before 1932	10	5	3
25/-	45/-	58	***Heifer** born in 1932	10	5	3
25/-	45/-	59	**Heifer** born in 1933	10	5	3
25/-	45/-	60	**Bull** born in or before 1932	10	5	3
25/-	45/-	61	**Bull** born in 1933	10	5	3

[2] **Kinmount Challenge Cup,** value about £50, for the best Female Animal in the Red Poll Classes registered in the Red Poll Cattle Society's Herd-Book. "Extra Stock" eligible to compete.

Special Prizes for Cows from Grade "A" (Tuberculin Tested) or Certified Herds, drawn from Classes 29, 39, 40, 41, 48, 49, 50, 57, and 65. (*See page* 119.)

Prize Money by Society . . . £60
[3] Contributed Prizes 30

FAT CATTLE

Judge: Sylvester Campbell

(*To be judged at* 2.30 p.m. *on Tuesday,* 19*th June*)

President's Champion Medal for best Fat Animal

Members	*Non-Members*	*Class*		*First*	*Second*	*Third*
25/-	45/-	62	**Bullock,** any pure breed or cross, born on or after 1st December 1931 and before 1st December 1932	7	3	–
25/-	45/-	63	**Bullock,** any pure breed or cross, born on or after 1st December 1932	7	3	–
25/-	45/-	64	**Heifer,** any pure breed or cross, and of any age	7	3	–

Prize Money by Society . . £30

[Exhibitors of Fat Cattle must state the breed of the sire and dam when making their entries.]

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* See Rule 33.

[1] Cows in this Class must have produced a calf within fifteen months prior to the Show.

[2] This Cup was presented to the Society by the late Lieut.-Colonel Charles Brook of Kinmount, Annan. The winner of the Cup shall, before delivery thereof is made to him, give security to the Society that he shall surrender the same to the Society and deliver it at the Society's office when called upon to do so.

[3] Contributed by the Red Poll Cattle Society.

ENTRY FEES		*CLASS*		*PREMIUMS*			
Members	*Non-Members*			*First*	*Second*	*Third*	*Fourth*
			CATTLE				
			DAIRY COWS	£	£	£	£
			Judge: William Burkitt				
			(*To be judged at* 9.30 A.M. *on Tuesday*, 19*th June*)				
			President's Champion Medal for best Dairy Cow in Class 65				
25/-	45/-	65	***Dairy Cow**, in Milk, any pure breed or cross, and of any age	10	7	3	–
			N.B.—Pure Bred Dairy Cows for which Classes are otherwise provided—*e.g.*, Belted Galloways, Ayrshires with milk records, British Friesians, and Red Polls—are not eligible for this Class.				
			PRIZE MONEY BY SOCIETY . . £20				
			Special Prizes for Dairy Cows				
			Judge: William Burkitt				
			(*To be judged at* 10.30 A.M. *on Wednesday*, 20*th June*)				
			[1] **Cows** from Grade "A" (Tuberculin Tested) or Certified Herds, drawn from Classes 29, 39, 40, 41, 48, 49, 50, 57, and 65	12	8	5	3
			PRIZE MONEY BY SOCIETY . . £8 [1] CONTRIBUTED . . . 20				
			PRIZE MONEY BY SOCIETY . . £1382 0 CONTRIBUTED . . . 180 0 CUPS, MEDALS, &c.. . . 1639 5 **Total Prizes for Cattle** . £3201 5				
			[See Note as to **EXTRA STOCK**, p. 138.]				

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* See Rules 32 and 42.

[1] £10 given by Messrs Brown & Polson, Ltd., Paisley, and £10 given by Messrs William MacKean, Ltd., Paisley.

*HORSES

CLYDESDALE

STALLION AND COLT

Judges: Peter Dewar; John M'K. M'Farlane

(*To be judged at* 9.30 A.M. *on Tuesday*, 19*th June*)

President's Champion Medal for best Clydesdale Stallion or Colt

ENTRY FEES Members	ENTRY FEES Non-Members	CLASS		PREMIUMS First £	PREMIUMS Second £	PREMIUMS Third £	PREMIUMS Fourth £
55/-	75/-	66	**Stallion** born before 1931	20	15	10	4
55/-	75/-	67	**Entire Colt** born in 1931	20	15	10	4
55/-	75/-	68	**Entire Colt** born in 1932	20	15	10	4
40/-	60/-	69	**Entire Colt** born in 1933	15	9	6	4

[1] **Cawdor Challenge Cup**, value 50 Guineas, for best Clydesdale Stallion or Colt, "Extra Stock" eligible to compete.

Breeder of best Male Animal of any age in the above Classes ("Extra Stock" not eligible to compete)—The Silver Medal.

PRIZE MONEY BY SOCIETY . . £181

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* For prizes given by the Society, no animal is allowed to enter in more than one Class, except that horses entered in other Classes may also compete in the Jumping Classes.

[1] This Cup is offered by the Clydesdale Horse Society of Great Britain and Ireland (subject to the conditions of that Society) for the best Clydesdale Stallion or Colt registered in the Clydesdale Stud-Book, entered in any of the Clydesdale Horse Classes, at the Show at which it may be competed for. No Stallion rising five years old or upwards will be allowed to compete for this Cup unless proof be furnished to satisfy a Committee, appointed for this purpose by the Council of the Clydesdale Horse Society, that he has during the preceding season left at least 35 per cent of the mares served by him in foal. The Cup must be won four times by an Exhibitor with different animals (but not necessarily in consecutive years) before it becomes his absolute property. No animal which has won a Cawdor Cup shall be eligible to compete. The animal winning this Cup must be certified free from hereditary disease. The winner of the Cup, other than the absolute winner, shall, before delivery thereof is made to him, give security to the Clydesdale Horse Society that he shall surrender the same to the Society and deliver it at the Society's office when called upon to do so. Until the Cup be won outright, the winner on each occasion will receive the Clydesdale Horse Society's Silver Medal as a memento of his winning the Cup.

Stallions and Colts, 2 years old and upwards, must be licensed for stud purposes. See Rule 39.

HORSES

CLYDESDALE *continued*

GELDING

Got by a Registered Clydesdale Stallion

Judges: James Kilpatrick; John Wilson

(*To be judged at* 2.30 P.M. *on Tuesday*, 19*th June*)

President's Champion Medal for best Clydesdale Gelding

ENTRY FEES		*CLASS*		*PREMIUMS*			
Members	*Non-Members*			*First*	*Second*	*Third*	*Fourth*
				£	£	£	£
40/-	60/-	70	**Gelding** born before 1931	15	9	6	4
40/-	60/-	71	**Gelding** born in 1931	15	9	6	4
40/-	60/-	72	**Gelding** born in 1932	15	9	6	4
40/-	60/-	73	**Gelding** born in 1933	12	8	4	2

[1]**The Meiklem Gold Challenge Cup**, value 110 guineas, for best Clydesdale Gelding, to become the property of an Exhibitor who shall win it four times with different animals, but not necessarily in succession. No animal which has already won the Cup is eligible to compete. "Extra Stock" eligible to compete.

PRIZE MONEY BY SOCIETY . £128

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[1] Given by Mr William Meiklem, Bennochy Park, Kirkcaldy.

Stallions and Colts, 2 years old and upwards, must be licensed for stud purposes. See Rule 39.

HORSES

CLYDESDALE—*continued*

MARE AND FILLY

Judges: Charles Aitkenhead; William Meiklem

(*To be judged at 9.30 A.M. on Tuesday, 19th June*)

President's Champion Medal for best Clydesdale Mare or Filly

ENTRY FEES		*CLASS*		*PREMIUMS*			
Members	*Non-Members*			*First*	*Second*	*Third*	*Fourth*
				£	£	£	£
55/-	75/-	74	**Mare** of any age, with Foal at foot, or due to foal before 31st July 1934	20	12	7	4
40/-	60/-	75	**Yeld Mare** born before 1931	15	9	6	4
40/-	60/-	76	**Yeld Mare or Filly** born in 1931 . . .	15	9	6	4
40/-	60/-	77	**Filly** born in 1932	15	9	6	4
40/-	60/-	78	**Filly** born in 1933	15	9	6	4

[1] **Renfrewshire Perpetual Gold Challenge Cup,** value £250, for best Clydesdale Mare or Filly, "Extra Stock" eligible to compete.

[2] **Cawdor Challenge Cup,** value 50 Guineas, for best Clydesdale Mare or Filly, "Extra Stock" eligible to compete.

[3] **William Taylor Memorial Prize of £10 and Certificate** to the breeder of the best Clydesdale Filly entered in Classes 77 and 78.

PRIZE MONEY BY SOCIETY . .	£179
CONTRIBUTED PRIZE . . .	10

Total Prize Money for Clydesdale Horses, £498

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[1] This Cup, along with an endowment of £500, was provided from money collected in Renfrewshire by the late Provost Muir M'Kean of Paisley, and is in commemoration of the Society's first Show in the county of Renfrew in 1913. This year the Cup is offered for the best Clydesdale Mare or Filly. The animal winning the Cup must be certified free from hereditary disease. The winner of the Cup shall, before delivery thereof is made to him, give security to the Society that he shall surrender the same to the Society and deliver it at the Society's office when called upon to do so. The winner of the Cup on each occasion will receive a miniature replica in silver as a memento of his winning the Cup.

[2] This Cup is offered by the Clydesdale Horse Society of Great Britain and Ireland (subject to the conditions of that Society) for the best Clydesdale Mare or Filly registered in the Clydesdale Stud-Book, entered in any of the Clydesdale Horse Classes, at the Show at which it may be competed for. The Cup must be won four times by an Exhibitor with different animals (but not necessarily in consecutive years) before it becomes his absolute property. No animal which has won a Cawdor Cup shall be eligible to compete. The animal winning this Cup must be certified free from hereditary disease. The winner of the Cup, other than the absolute winner, shall, before delivery thereof is made to him, give security to the Clydesdale Horse Society that he shall surrender the same to the Society and deliver it at the Society's office when called upon to do so. Until the Cup be won outright, the winner on each occasion will receive the Clydesdale Horse Society's Silver Medal as a memento of his winning the Cup.

[3] Given by William Taylor Memorial Committee.

Stallions and Colts, 2 years old and upwards, must be licensed for stud purposes. See Rule 39.

Entry Fees				*Premiums*			
Members	*Non-Members*	*Class*	**HORSES**	*First*	*Second*	*Third*	*Fourth*
			HUNTER	£	£	£	£
			Judge: E. W. Hope-Johnstone				
			(*Classes* 79 *to* 82 *to be judged at* 11 A.M. *on Tuesday, 19th June*)				
			President's Champion Medal for best Hunter				
55/-	75/-	79	**Hunter Brood Mare, with** Foal at foot, or due to foal before 31st July 1934	15	7	3	–
40/-	60/-	80	**Yeld Mare, Filly, or Gelding** born in 1931—*in hand*	10	5	3	–
40/-	60/-	81	**Yeld Mare, Filly, or Gelding** born in 1932—*in hand*	10	5	3	–
40/-	60/-	82	**Filly, Colt, or Gelding** born in 1933—*in hand*	10	5	3	–
			(*Classes* 83 *to* 86 *to be judged at* 2.30 P.M. *on Tuesday, 19th June*)				
40/-	60/-	83	**Mare or Gelding** born before 1930, to carry 14 stone and over—*in saddle*	15	10	5	–
40/-	60/-	84	**Mare or Gelding** born before 1930, to carry 13 stone and under 14 stone—*in saddle*	15	10	5	–
40/-	60/-	85	**Mare or Gelding** born in 1930, to carry 12 stone 7 lb. and over—*in saddle*	15	10	5	–
40/-	60/-	86	**Hack of Hunter Type,** born in or before 1930, 15.2 hands and under—*in saddle*	8	5	3	–
			[1] **Dumfries Centenary Silver Challenge Cup,** value £100, for best Hunter. The Cup to become the property of an Exhibitor who shall win it three times, not necessarily in succession, at Shows at which there are not less than three Saddle Classes. "Extra Stock" not eligible to compete.				
			[2] **Best Hunter Filly,** entered in Classes 80, 81, and 82, registered with a number in the Hunter Stud-Book, or the entry tendered within one month of the award—Champion Gold Medal, value £5.				
			PRIZE MONEY BY SOCIETY . . £185				

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[1] Presented by Members of the Dumfriesshire Hunt in 1930 to commemorate the centenary of the Highland Society's first Show at Dumfries in 1830.

[2] Given by the Hunters' Improvement and National Light Horse Breeding Society.

Stallions and Colts, 2 years old and upwards, must be licensed for stud purposes. See Rule 39.

HORSES

*[1] HIGHLAND and WESTERN ISLAND PONIES

Judge: John A. Cameron

President's Champion Medal for best Highland or Western Island Pony (Classes 87 to 91)

(To be judged at 2 P.M. on Tuesday, 19th June)

Entry Fees		*Class*		*Premiums*		
Members	*Non-Members*			*First*	*Second*	*Third*
				£	£	£
40/-	60/-	87	**Stallion** born before 1932, not exceeding 14.2 hands	8	4	2
40/-	60/-	88	**Entire Colt** born on or after 1st January 1932, not exceeding 14.2 hands	6	4	2
40/-	60/-	89	**Mare**, any age, not exceeding 14.2 hands, with Foal at foot, or due to foal before 31st July 1934 .	8	4	2
40/-	60/-	90	**Yeld Mare or Filly** born before 1932, not exceeding 14.2 hands	8	4	2
40/-	60/-	91	**Filly** born on or after 1st January 1932, not exceeding 14.2 hands	6	4	2
40/-	60/-	92	**Gelding** born before 1932, not exceeding 14.2 hands	6	4	2

[2] **Special Prize of £8** given by Highland Pony Society for best Male Animal not exceeding 14.2 hands, entered in Classes 87, 88, and 92. "Extra Stock" not eligible to compete.

[2] **Special Prize of £8** given by Highland Pony Society for best Female Animal not exceeding 14.2 hands, entered in Classes 89, 90, and 91. "Extra Stock" not eligible to compete.

[3] **Special Prize of £5** for best Stallion entered in Class 87. "Extra Stock" eligible to compete.

[3] **Special Prize of £5** for best Entire Colt entered in Class 88.

Prize Money by Society . .	£38
Contributed Prizes . .	66

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* See Rule 28.

[1] The Department of Agriculture for Scotland give £40 towards prizes for Highland and Western Island Ponies.

[2] The animals winning these prizes must be entered or accepted for entry in the Highland Section of the National Pony Stud-Book. Competition to be strictly confined to animals passed sound and free from hereditary disease.

[3] Given by the National Pony Society.

Stallions and Colts, 2 years old and upwards, must be licensed for stud purposes. See Rule 39.

HORSES

SHETLAND PONIES

Judge: P. F. Manson

(*To be judged at* 2 P.M. *on Tuesday*, 19*th June*)

(*All to be shown in hand*)

President's Champion Medal for best Shetland Pony

ENTRY FEES: Members	ENTRY FEES: Non-Members	CLASS		PREMIUMS: First £	PREMIUMS: Second £	PREMIUMS: Third £	PREMIUMS: Fourth £
35/-	55/-	93	**Stallion**, not exceeding 10½ hands, born before 1931	8	5	3	2
35/-	55/-	94	**Entire Colt**, not exceeding 10½ hands, born in 1931 or 1932	8	5	3	2
35/-	55/-	95	**Mare**, not exceeding 10½ hands, with Foal at foot, or due to foal before 31st July 1934 . .	8	5	3	2
35/-	55/-	96	**Yeld Mare**, not exceeding 10½ hands . .	8	5	3	2
35/-	55/-	97	**Filly**, not exceeding 10½ hands, born in 1931 or 1932	8	5	3	2
			[1] **Best Group of Shetland Ponies**, drawn from the ordinary Classes, consisting of one male and two females	10	—	—	—
			[1] **Silver Medal** for the best Shetland Pony of the sex opposite to that of the winner of the President's Medal, entered or eligible for entry in the Shetland Pony Stud-Book.				
			PRIZE MONEY BY SOCIETY . . £90				
			CONTRIBUTED PRIZES . . 10				

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[1] Given by the Shetland Pony Stud-Book Society.

Stallions and Colts, 2 years old and upwards, must be licensed for stud purposes. See Rule 39.

HORSES

SADDLE CLASSES

Judge: E. W. Hope-Johnstone

(To be judged at 10.30 A.M. *on Wednesday, 20th June)*

ENTRY FEES		CLASS		PREMIUM		
Members	*Non-Members*			*First*	*Second*	*Third*
				£	£	£
5/-	5/-	98	**Mare or Gelding,** any age, over 13 hands, and not exceeding 14.2 hands—*in saddle* . . .	5	3	2
5/-	5/-	99	**Mare or Gelding, any age, not exceeding 13 hands**—*in saddle*	5	3	2

PRIZE MONEY BY SOCIETY . . £20

[Ponies in the above Classes to be exhibited on Wednesday only. They must be in the Showyard not later than 9 A.M. on Wednesday and may leave immediately after the afternoon Parade. **Boxes are not provided for these ponies.**]

[1] HACKNEYS IN HARNESS

Judge: Captain R. MacLean

(To be judged at 4 P.M. *on Wednesday, 20th June)*

[2] *President's Champion Medal for best Animal in the Classes for Hackneys in Harness*

ENTRY FEES		CLASS		PREMIUM		
Members	*Non-Members*			*First*	*Second*	*Third*
				£	£	£
40/-	60/-	100	**Stallion, Mare, Filly, or Gelding,** any age, in Harness, exceeding 15 hands, to be driven in the ring	15	10	5
40/-	60/-	101	**Stallion, Mare, Filly, or Gelding,** any age, in Harness, over 14 hands and not exceeding 15 hands, to be driven in the ring . .	15	10	5
40/-	60/-	102	**Stallion, Mare, Filly, or Gelding,** any age, in Harness, not exceeding 14 hands, to be driven in the ring	10	5	3

PRIZE MONEY BY SOCIETY . . £78

[Hackneys in Harness Classes must be in the Showyard not later than Tuesday evening, judged on Wednesday, and may leave the Showyard on Thursday immediately after the Afternoon Parade.]

Shed accommodation for machines for Driving Competitions—Members, 10s.; Non-Members, 20s.

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[1] Animals entered in other Classes may be entered in the Harness Classes at an additional fee of 5s. if they are eligible.

[2] *An animal that has won a President's Champion Medal in another section in this Show shall not be eligible to compete for the Medal in this section.*

HORSES

HORSES IN HARNESS

Judges: James Kilpatrick; John Wilson

(To be judged at 11 A.M. *on Friday,* 22*nd June)*

ENTRY FEES *Members*	*ENTRY FEES* *Non-Members*	*CLASS*		*PREMIUMS* *First*	*PREMIUMS* *Second*	*PREMIUMS* *Third*
5/-	10/-	103	**Draught Gelding,** any age, in Harness, shown in Cart or Lorry (and driven by single driver), it being a condition that the Horse must have been regularly worked for a period of 12 weeks prior to the first day of the Show, to be exhibited on Friday, the 22nd June; only the prize-winners to take part, as required, in the Parade on Friday. Prize Money—£10, £6, £5, £4, £3, £2 and £1. PRIZE MONEY BY SOCIETY . . £31			
			(To be judged at 11.30 A.M. *on Friday,* 22*nd June)*			
5/-	10/	104	**Horse,** any age, in Harness, shown in Van or Light Lorry, it being a condition that the Horse must have been regularly worked for a period of 12 weeks prior to the first day of the Show, to be exhibited on Friday, the 22nd June; only the prize-winners to take part, as required, in the Parade on Friday. Prize Money—£10, £5, £3, £2 and £1. PRIZE MONEY BY SOCIETY . . £21			

(Geldings entered in the Ordinary Classes are not eligible for entry in Classes 103 and 104.)

[*Note.*—Entries in Classes 103 and 104 close on 12th June. The Entries to appear in the Jumping Programme for Friday, 22nd June.]

PRIZE MONEY BY SOCIETY .	£951	0
CONTRIBUTED	86	0
CUPS, MEDALS, &c. . .	575	10
Total Prizes for Horses	£1612	10

[See Note as to **EXTRA STOCK**, p. 138.]

JUMPING COMPETITIONS

SPECIAL REGULATIONS

(*See also the Regulations on pages* 89 *to* 98)

1. Jumping Competitions will take place on the afternoons of Wednesday, Thursday, and Friday, 20th, 21st, and 22nd June, and on the evenings of Wednesday and Thursday, 20th and 21st June.
2. *Entries* for each afternoon Competition will close at the Secretary's Office in the Showyard at 5 P.M. on the preceding day. Entries for Evening Jumping may be received until 5 P.M. on the evening of the Competition.
3. *Entry Fees.*—Wednesday and Thursday afternoons, £1; Friday, 10s. Evening Jumping, 10s.
4. *Accommodation* for jumping horses will be provided as follows: Covered shed in which to stand during the day free of charge; or, on application to the Secretary not less than ten days before the opening of the Show, loose-boxes will be provided at a charge (in addition to the Entry Fee) of £1, which must be paid along with the Entry Fee at the time of application.
5. Horses entered for jumping only need not enter the Showyard till 12 noon on the day of Competition, and may leave the Showyard at the close of the jumping.
6. *The Jumps* may consist of Single Hurdle, Gate, Double Hurdle, Wall, and Water Jump, power being reserved by the Society to alter these, as well as the Handicaps, as may be thought desirable.

ENTRY FEE	*CLASS*		*First*	*Second*	*Third*	*Fourth*	*Fifth*
		WEDNESDAY.					
		AFTERNOON.	£	£	£	£	£
20/-	1	**Horse or Pony,** any height	20	15	10	5	3
		EVENING.					
10/-	2	**Horse or Pony,** any height, confined to competitors permanently resident in Scotland. The Horse or Pony to have been the property of the competitor since 1st May 1934 . . .	10	8	5	3	2
		THURSDAY.					
		AFTERNOON.					
20/-	3	**Horse or Pony,** any height, Handicap, hurdles and gate being raised 8 inches for the winner of the first prize, and 4 inches for the winner of the second prize in Class 1	20	15	10	5	3
		EVENING.					
10/-	4	**Horse or Pony,** any height	10	8	5	3	2
		FRIDAY.					
		AFTERNOON.					
10/-	5	**Horse or Pony,** any height, Handicap, hurdles and gate being raised 8 inches for the winner of the first prize, and 4 inches for the winner of the second prize in either of Classes 1 or 3—4 inches extra for the winner of the two first prizes in Classes 1 and 3	15	10	5	3	2
		Champion Prize for most points in Prizes with *one horse* in Classes 1, 3, and 5—First Prize to count five points; Second Prize, four points; Third Prize, three points; Fourth Prize, two points; and Fifth Prize, one point—the money to be evenly divided in the event of a tie . .	10	–	–	–	–
		Total Prize Money for Jumping, £207.					

Special Entry Forms for above Competitions to be had on application.

SHEEP

*BLACKFACE

Judges: James Craig; Donald M'Dougall

President's Champion Medal for best Blackface Sheep

Entry Fees		*Class*		*Premiums*			
Members	*Non-Members*			*First*	*Second*	*Third*	*Fourth*
				£	£	£	£
15/-	25/-	105	**Tup** three shear and over	12	8	4	2
15/-	25/-	106	**Tup** two shear	12	8	4	2
15/-	25/-	107	**Shearling Tup**	12	8	4	2
15/-	25/-	108	**Tup Lamb**	5	3	2	-
15/-	25/-	109	**Ewe** above one shear (born before 1933), with **Lamb** at foot	10	5	3	2
15/-	25/-	110	**Shearling Ewe or Gimmer** (born in 1933)	10	5	3	2

[1] **The "Angus" Perpetual Silver Challenge Cup,** value 50 guineas, for the best Blackface Sheep, "Extra Stock" eligible to compete.

[2] **The "James Archibald" Prize,** of about £20, for the best Sheep in the Blackface Classes (excluding Lambs), "Extra Stock" eligible to compete.

Prize Money by Society	£128
Contributed Prize	20

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* Formal Declarations must be made at time of entry that the conditions as regards clipping, &c., have been strictly adhered to (see Rule 43).

[1] This Cup was presented by the Angus Agricultural Association to commemorate the holding of the Society's Annual Show at Dundee in 1933. On this occasion the Cup is offered for the best Blackface Sheep. The animal winning the Cup must be certified free from hereditary disease. The winner of the Cup shall, before delivery thereof is made to him, give security to the Society that he shall surrender same to the Society and deliver it at the Society's Office when called upon to do so.

[2] This Prize consists of the annual free income from a fund of £600, gifted by the late Mr David Archibald, Christchurch, New Zealand, to found a Prize to be offered at the Annual Shows of the Society in commemoration of his brother, the late James Archibald, Overshiels, Stow.

SHEEP

CHEVIOT

Judges : William I. Elliot ; John Murray

President's Champion Medal for best Cheviot Sheep

ENTRY FEES		CLASS		PREMIUMS			
Members	Non-Members			First	Second	Third	Fourth
				£	£	£	£
15/-	25/-	111	**Tup above one shear**	12	8	4	2
15/-	25/-	112	**Shearling Tup**	12	8	4	2
15/-	25/-	113	**Tup Lamb**	5	3	2	–
15/-	25/-	114	**Ewe** above one shear, with **Lamb** at foot	10	5	3	2
15/-	25/-	115	**Shearling Ewe or Gimmer**	10	5	3	2
15/-	25/-	116	**Ewe Lamb**	5	3	2	–

[1] **Borthwick Perpetual Challenge Cup,** value £25, gifted by Mr J. Borthwick, for best Sheep in the Cheviot Classes. "Extra Stock" not eligible to compete.

Prize Money by Society . . £112

Given by the Cheviot Sheep Society.

SHEEP

BORDER LEICESTER

Judges: Harry B. Moyes; Niven M. Paterson

President's Champion Medal for best Border Leicester Sheep

ENTRY FEES Members	ENTRY FEES Non-Members	CLASS		PREMIUMS First £	PREMIUMS Second £	PREMIUMS Third £	PREMIUMS Fourth £
15/-	25/-	117	**Tup** above one shear	12	8	4	2
15/-	25/-	118	**Shearling Tup**	12	8	4	2
15/-	25/-	119	**Tup Lamb**	10	5	3	2
15/-	25/-	120	**Ewe** above one shear	10	5	3	2
15/-	25/-	121	**Shearling Ewe or Gimmer**	10	5	3	2
15/-	25/-	122	**Ewe Lamb**	5	3	2	–

[1] **Tweeddale Gold Medal,** value about £25, for best Border Leicester Tup, "Extra Stock" eligible to compete.

[2] **Gold Medal** for best Male Animal in the Border Leicester Classes, registered or eligible for registration in the Border Leicester Flock-Book. Animals entered as "Extra Stock" not eligible.

[2] **Gold Medal** for best Female Animal in the Border Leicester Classes, registered or eligible for registration in the Border Leicester Flock-Book. Animals entered as "Extra Stock" not eligible.

PRIZE MONEY BY SOCIETY . . £122

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[1] Annual Free Income from Fund of £500.

[2] Given by the Society of Border Leicester Sheep Breeders.

SHEEP

HALF-BRED

Judge : Thomas Douglas

President's Champion Medal for best Half-Bred Sheep

ENTRY FEES Members	ENTRY FEES Non-Members	CLASS		PREMIUMS First £	PREMIUMS Second £	PREMIUMS Third £
15/-	25/-	123	**Shearling Tup**	10	7	3
15/-	25/-	124	**Ewe above one shear**	10	5	2
15/-	25/-	125	**Shearling Ewe or Gimmer**	10	5	2
15/-	25/-	126	**Ewe Lamb**	5	3	2

PRIZE MONEY BY SOCIETY . . £64

OXFORD DOWN

Judge : William M. Malcolm

(All sheep to be entered or eligible for entry in the Flock-Book)

President's Champion Medal for best Oxford Down Sheep

ENTRY FEES Members	ENTRY FEES Non-Members	CLASS		PREMIUMS First £	PREMIUMS Second £	PREMIUMS Third £
15/-	25/-	127	**Shearling Tup**	8	5	3
15/-	25/-	128	**Shearling Ewe or Gimmer**	8	5	3
15/-	25/-	129	**Tup Lamb**	8	5	3
15/-	25/-	130	**Ewe Lamb**	5	3	2

PRIZE MONEY BY SOCIETY . . £47

[1] CONTRIBUTED PRIZES . . . 11

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[1] Given by Oxford Down Sheep-Breeders' Association.

SHEEP

SUFFOLK

Judge: C. J. Rush

(*All sheep to be entered or eligible for entry in the Flock-Book*)

President's Champion Medal for best Suffolk Sheep

ENTRY FEES *Members*	*ENTRY FEES* *Non-Members*	*CLASS*		*PREMIUMS* *First* £	*PREMIUMS* *Second* £	*PREMIUMS* *Third* £
15/-	25/-	131	**Tup** one shear and over	10	7	3
15/-	25/-	132	**Shearling Ewe or Gimmer**	10	5	2
15/-	25/-	133	**Tup Lamb**	10	5	2
15/-	25/-	134	**Ewe Lamb**	5	3	2

[1] **Silver Challenge Cup,** value £15, offered by the Suffolk Sheep Society for best Group of Suffolk Sheep, consisting of one Tup, one shear and over, one Shearling Ewe or Gimmer, one Tup Lamb, and one Ewe Lamb—the Females and Tup Lamb must be bred by Exhibitor—*drawn from above Classes.* The Cup to become the property of an Exhibitor winning it three times, not necessarily in succession.

PRIZE MONEY BY SOCIETY . . £64

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[1] Given by the Suffolk Sheep Society.

SHEEP

DORSET HORN

Judge : C. J. Rush

President's Champion Medal for best Dorset Horn Sheep

Entry Fees *Members*	*Entry Fees* *Non-Members*	*Class*		*Premiums* *First* £	*Premiums* *Second* £	*Premiums* *Third* £
15/-	25/-	135	**Tup,** any age	6	4	2
15/-	25/-	136	**Ewe or Gimmer**	5	3	2

Prize Money by Society . . . £17

[1] Contributed Prizes 5

FAT SHEEP

Judge : Thomas Douglas

President's Champion Medal for best pen of Fat Sheep

Entry Fees *Members*	*Entry Fees* *Non-Members*	*Class*		*Premiums* *First* £	*Premiums* *Second* £	*Premiums* *Third* £
15/-	25/-	137	**Three Fat Lambs,** any breed or cross, dropped in the year of the Show	5	3	2

[Exhibitors of Fat Sheep must state the breed of sire and dam when making their entries.]

Prize Money by Society . . £10

	£	s.
Prize Money by Society	£564	0
Contributed	36	0
Cups, Medals, &c.	137	10
Total Prizes for Sheep	£737	10

[See Note as to **EXTRA STOCK**, p. 138.]

Given by the Dorset Horn Sheep-Breeders' Association, Dorchester, Dorset.

GOATS

Judge: Miss M. Henderson

REGULATIONS FOR GOAT CLASSES.

The animals will be milked dry at 6 o'clock on the evening previous to the opening of the Show, in the presence of, and to the satisfaction of, the Steward or a representative of the Society duly authorised by him.

All exhibits must be registered either in the Herd-Book, Foundation Book or Show Register of the British Goat Society, in the name of the Exhibitor (the registered number being quoted on the entry form), or, if previously entered or owned by someone other than the Exhibitor, a transfer of ownership must be registered with the British Goat Society.

President's Champion Medal for best animal in the Goat Classes

(All animals must be registered)

ENTRY FEES Members	ENTRY FEES Non-Members	CLASS		PREMIUMS First £	PREMIUMS Second £	PREMIUMS Third £
5/-	10/-	138	**Female Goat,** Toggenburg, British Toggenburg, or British Alpine, in Milk	3	2	1
5/-	10/-	139	**Female Goat,** Saanen or British Saanen, in Milk	3	2	1
5/-	10/-	140	**Female Goat,** any other variety, in Milk	3	2	1
5/-	10/-	141	**Goatling,** Toggenburg, British Toggenburg, or British Alpine, over one but not exceeding two years	3	2	1
5/-	10/-	142	**Goatling,** any other variety, over one but not exceeding two years	3	2	1
5/-	10/-	143	**Female Kid,** any variety, not exceeding one year	3	2	1
5/-	10/-	144	**Male Kid,** any variety, not exceeding one year	3	2	1
5/-	10/-	145	**Milking Competition,** for quality, open to Classes 138, 139, and 140	3	2	1
5/-	10/-	146	**Milking Competition,** for quantity, open to Classes 138, 139, and 140	3	2	1

The Competition for Goats is recognised by the British Goat Society, Roydon Road, Diss, Norfolk, which will give Challenge Certificates (qualifying for a Championship) for the best Female Goat over two years that has borne a kid; for the best dual purpose Goat over two years that has borne a kid; and a Bronze Medal for the best female exhibit in Classes 138 to 143 inclusive.

ENTRY FEES		*CLASS*		*PREMIUMS*		
Members	*Non-Members*			*First*	*Second*	*Third*
				£	£	£

GOATS

[1] **Challenge Cup, value 20 Guineas, for the best Female Goat in the Show.**

[2] **Challenge Cup, value £10, for best Female Anglo-Nubian Goat over two years old, in Milk, entered in the Anglo-Nubian section of the Herd-Book, "Extra Stock" eligible to compete.**

REGULATIONS FOR MILKING COMPETITION (CLASSES 145 AND 146).

Goats entered for this Competition must be entered in both the Quality and Quantity Classes.

The animals will be milked at 7 P.M. on Wednesday, 20th June, at an appointed place in the order arranged by the Steward, and the milk of the next twenty-four hours will be taken for the Quality and Quantity Milking Competitions. The hours of milking shall be 7 A.M. and 7 P.M. on Thursday, 21st June.

The prizes will be awarded according to the following scale of points:—

For each pound of milk	1 point.
For each complete 6 days the Goat has been in milk (omitting the first forty days), with a maximum of 5·4 points	$\frac{1}{10}$ of a point.
For each $\frac{1}{4}$ lb. of fat in the milk	5 points.

In cases where the milk contains less than 3 per cent of fat 1 point will be deducted.

In the Quantity Milking Competition points will be awarded for quantity and lactation only.

The period of lactation to be calculated from the date of kidding to the first day of the Show. No prize will be awarded to a Goat giving less than 5½ lbs. of milk per day.

Fractions of lbs. of milk and percentages of fat to be worked out in decimals and added to the total points.

A Certificate giving the last date of kidding, signed by the owner of the Goat exhibited, or his Agent, must in every case be brought to the Steward of Goats as soon as possible after the animal has arrived in the Showyard. Any Goat that has not kidded within two years preceding the date of the Show may not compete.

The milk yielded by Goats in the Showyard shall be the property of the Society.

***Note.*—No animal is allowed to compete in more than one Class, except that Goats entered in Classes 138, 139, and 140 may also be entered in Classes 145 and 146.**

PRIZE MONEY BY SOCIETY	£42	0
DEPARTMENT OF AGRICULTURE FOR SCOTLAND	12	0
CUPS	31	0
Total Prizes for Goats	£85	0

[See Note as to **EXTRA STOCK**, p. 138.]

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[1] Given by the late Lord Dewar, London—to be competed for annually.

[2] Given by Mrs S. Macdonald—to be competed for annually.

*PIGS

LARGE WHITE

Judge: Alfred W. White

(*All Large White Pigs to be entered or eligible for entry in the Herd-Book of the National Pig-Breeders' Association*)

President's Champion Medal for best Large White Pig

ENTRY FEES Members	ENTRY FEES Non-Members	CLASS		PREMIUMS First £	PREMIUMS Second £	PREMIUMS Third £
15/-	25/-	147	**Boar** born before 1933	8	4	2
15/-	25/-	148	**Boar** born in 1933 before 1st July	8	4	2
15/-	25/-	149	**Boar** born in 1933 on or after 1st July	6	4	2
15/-	25/-	150	**Boar** born in 1934	6	3	1
15/-	25/-	151	**Sow** born before 1933	8	4	2
15/-	25/-	152	**Sow** born in 1933 before 1st July	8	4	2
15/-	25/-	153	**Sow** born in 1933 on or after 1st July	6	4	2
15/-	25/-	154	**Sow** born in 1934	6	3	1
			[1]**Dundee Citizens' Perpetual Silver Challenge Cup,** value about £50, for the best Large White Pig, "Extra Stock" eligible to compete.			
			[2]**Gold Medal,** value £5 (or cash), for best Large White Boar, "Extra Stock" eligible to compete.			
			[2]**Gold Medal,** value £5 (or cash), for best Large White Sow, "Extra Stock" eligible to compete.			
			[2]**Special Prizes** for the best Group of four Large White Pigs bred by Exhibitor. One Boar (at least) must be included in the Group, and not more than one entry to be selected from any one Class. "Extra Stock" eligible to compete	3	2	–

PRIZE MONEY BY SOCIETY . . £95

[2]CONTRIBUTED 10

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* See Rule 35.

[1] This Cup was presented by the Citizens of Dundee to commemorate the holding of the Society's Annual Show at Dundee in 1933. The animal winning the Cup must be certified free from hereditary disease. The winner of the Cup shall, before delivery thereof is made to him, give security to the Society that he shall surrender same to the Society, and deliver it at the Society's office when called upon to do so. The winner on each occasion will receive a Medal as a memento of his winning the Trophy.

[2] Given by the National Pig-Breeders' Association.

PIGS

LARGE BLACK

Judge: S. Owen Webb

President's Champion Medal for best Large Black Pig

ENTRY FEES Members	ENTRY FEES Non-Members	CLASS		PREMIUMS First £	PREMIUMS Second £	PREMIUMS Third £
15/-	25/-	155	**Boar** born before 1934	8	4	2
15/-	25/-	156	**Boar** born in 1934	6	3	1
15/-	25/-	157	**Sow** born before 1933	8	4	2
15/-	25/-	158	**Sow** born in 1933	8	4	2
15/-	25/-	159	**Sow** born in 1934	6	3	1

[1] **Silver Challenge Cup,** value 12 Guineas, for best Large Black Boar or Sow owned by an Exhibitor resident in Scotland, and to become the property of an Exhibitor winning it twice in succession or three times at intervals.

[1] **Silver Medal** for the best Large Black Boar.

[1] **Silver Medal** for the best Large Black Sow.

Prize Money by Society	£44
[1] Contributed Prizes	18

Prize Money by Society	£139 0
Contributed	28 0
Cups, Medals, &c.	72 12
Total Prizes for Pigs	**£239 12**

For Conditions of the Scottish Bacon Pig Competition, see page 154.

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[1] Given by the Large Black Pig Society.

EXTRA STOCK

(Former Winners not eligible for Ordinary Classes)

Former winners not eligible for Ordinary Classes may be exhibited as Extra Stock, and may receive Awards as follows: the Silver Medal, the Medium Silver Medal, and the Bronze Medal.

Animals entered as Extra Stock are eligible to compete for the President's Medals, whether former winners of these Medals or not. They are also eligible to compete for Special Prizes where the conditions of these Prizes permit.

While every endeavour will be made to see that former winners are correctly entered in the Catalogue as "Extra Stock," the Society accepts no responsibility for this, it being the duty of Exhibitors to state clearly on the Entry Form the Show at which the animal became disqualified for the Ordinary Classes. If an animal appears in the Catalogue as entered in an Ordinary Class which should appear as "Extra Stock," it cannot thereafter be transferred to the "Extra Stock" Section.

Entry Fees—same as corresponding Classes.

*POULTRY

Judges: Richard Rodwell, 1 to 12, 31 to 48, 92 to 104; William Morgan, 13 to 30, 49 to 56, 65 to 67, 76 to 87; Ralph Alty, 57 to 64, 68 to 75, 88 to 91, 105 to 125.

[1] **Champion Challenge Silver Salver,** value £30, for the best exhibit in the Poultry Classes.

First Premium—TWENTY SHILLINGS; *Second Premium*—TEN SHILLINGS. In each Class in which there are four or more entries a Third Prize of Five Shillings may be awarded, provided there is sufficient merit in the pens. In addition to the Premiums, the Judges may award *one* Very Highly Commended, *one* Highly Commended, and as many Commended tickets in each Class as they consider justified by the number and merit of the entries.

Champion Silver Medals are offered as follows:—

1. Best Cock, any Variety.
2. Best Hen, any Variety.
3. Best Cockerel, any Variety.
4. Best Pullet, any Variety.
5. Best Waterfowl.
6. Best Turkey.
7. Best Utility Bird (Classes 92-104).

Aged Birds must have been hatched previous to, and Cockerels and Pullets in, the year of the Show.

Entry Fees—Members, 2s. 6d.; Non-Members, 4s.

	Class	
LEGHORN—		
White	1.	Cock
	2.	Hen
	3.	Cockerel
	4.	Pullet
Any other Colour	5.	Cock
	6.	Hen
	7.	Cockerel
	8.	Pullet
MINORCA	9.	Cock
	10.	Hen
	11.	Cockerel
	12.	Pullet
HAMBURGH	13.	Cock or Cockerel
	14.	Hen or Pullet
SCOTCH GREY	15.	Cock
	16.	Hen
	17.	Cockerel
	18.	Pullet
WELSUMMER	19.	Cock or Cockerel
	20.	Hen or Pullet
PLYMOUTH ROCK—		
Barred	21.	Cock
	22.	Hen
	23.	Cockerel
	24.	Pullet
Any other Colour	25.	Cock or Cockerel
	26.	Hen or Pullet

	Class	
ORPINGTON—		
Black	27.	Cock or Cockerel
	28.	Hen or Pullet
Any other Colour	29.	Cock or Cockerel
	30.	Hen or Pullet
WYANDOTTE—		
Gold or Silver	31.	Cock
	32.	Hen
	33.	Cockerel
	34.	Pullet
White	35.	Cock
	36.	Hen
	37.	Cockerel
	38.	Pullet
Partridge	39.	Cock or Cockerel
	40.	Hen or Pullet
Columbian	41.	Cock or Cockerel
	42.	Hen or Pullet
Any other Colour	43.	Cock or Cockerel
	44.	Hen or Pullet
RHODE ISLAND RED	45.	Cock
	46.	Hen
	47.	Cockerel
	48.	Pullet

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[1] Given by the late Lord Dewar. The Salver will become the property of an exhibito who shall win it three times, not necessarily in succession.

Special Entry Forms for Poultry Classes.

* See Regulations 16 and 67.

	Class
SUSSEX—	
Light	49. Cock
	50. Hen
	51. Cockerel
	52. Pullet
Any other Variety	53. Cock
	54. Hen
	55. Cockerel
	56. Pullet
DORKING—	
Coloured	57. Cock
	58. Hen
	59. Cockerel
	60. Pullet
Silver Grey	61. Cock
	62. Hen
	63. Cockerel
	64. Pullet
SCOTS DUMPY	65. Cock
	66. Hen
	67. Cockerel or Pullet
BARNEVELDER	68. Cock
	69. Hen
	70. Cockerel
	71. Pullet
INDIAN GAME	72. Cock
	73. Hen
	74. Cockerel
	75. Pullet
OLD ENGLISH GAME	76. Cock
	77. Hen
	78. Cockerel
	79. Pullet
BANTAM—	
Game—Old English	80. Cock
	81. Hen
Game—Modern	82. Cock
	83. Hen
Other than Game	84. Cock
	85. Hen
Any Variety	86. Cockerel
	87. Pullet
ANY OTHER RECOGNISED BREED OF POULTRY	88. Cock
	89. Hen
	90. Cockerel
	91. Pullet

	Class
UTILITY POULTRY—	
Leghorn—any Variety	92. Cock or Cockerel
Any other Variety—light breed	93. Cock or Cockerel
Wyandotte—any Colour	94. Cock or Cockerel
Any other Variety—heavy breed	95. Cock or Cockerel
Leghorn—White	96. Hen or Pullet
Leghorn—any other Colour	97. Hen or Pullet
Wyandotte—any Colour	98. Hen or Pullet
Rhode Island Red	99. Hen or Pullet
Barnevelder	100. Hen or Pullet
Rock—any Colour	101. Hen or Pullet
Any other Variety	102. Hen or Pullet
ANY CROSS FOR LAYING PURPOSES	103. Hen
ANY CROSS FOR LAYING PURPOSES	104. Pullet
DUCKS—	
Aylesbury	105. Drake
	106. Duck
	107. Drake (young)
	108. Duck (young)
Orpington	109. Drake
	110. Duck
	111. Drake (young)
	112. Duck (young)
Indian Runner	113. Drake
	114. Duck
Any other Variety	115. Drake
	116. Duck
GEESE	117. Gander
	118. Goose
TURKEYS	119. Cock
	120. Hen
TABLE POULTRY—	
Any pure Breed	121. Cock
	122. Cockerel
Any Cross	123. Cock
	124. Cockerel
Any Pure Breed or Cross	125. Pair of Pullets

AMOUNT OF POULTRY PREMIUMS, £218, 15s.

Special Entry Forms for Poultry Classes.

*DAIRY PRODUCE

Judge : William M'Fadzean

No Exhibitor to show more than one lot in any Class

Entry Fees—Members, 5s. ; Non-Members, 7s. 6d.

Class.	Premiums. 1st. £	2nd. £	3rd. £	4th. £	5th. £
1. Powdered Butter, not less than 3 lb.	4	3	2	1	-
2. Fresh Butter, three 1-lb. lots, to be made up in form of bricks	4	3	2	1	-
3. Cheddar Cheese, 56 lb. and upwards	9	5	3	2	1
4. Cheese, 14 lb. and under	5	3	2	1	-
Total			£51		

Special Entry Forms for Dairy Produce.

* See Regulations 75 and 76.

Railway delivery charges from station to Showyard and back to be paid by exhibitor. See p. 106.

EGGS

Judge : Alexander F. Smith

Entry Fee—2s. 6d.

Class.	Premiums 1st.	2nd.	3rd.
1. One dozen Hen Eggs—white	£1	15/-	10/-
2. One dozen Hen Eggs—brown	£1	15/-	10/-
3. One dozen Hen Eggs—tinted	£1	15/-	10/-
4. One dozen Duck Eggs	£1	15/-	10/-
5. One dozen Turkey Eggs	£1	15/-	10/-

PRIZE MONEY BY SOCIETY, £11, 5s.

Special Entry Forms for Eggs.

REGULATIONS.

1. All eggs must be fresh, and must be the produce of poultry the property of the exhibitor.

2. Eggs will be received at the Dairy Produce Shed in the Showyard on Monday, the day before the opening of the Show, and till 8 A.M. on Tuesday, the first day of the Show. Judged at 9.30 A.M. on Tuesday,

3. Eggs will be exhibited on suitable plates provided by the Society.

4. Eggs may be removed by exhibitors at the close of the Show ; where this is not done eggs will be returned only if a suitable box is provided for the purpose and the necessary postage or carriage thereon is prepaid.

FUR-PRODUCING RABBITS

(*To be judged at* 10 A.M. *on Wednesday*, 20*th June*)

Judge: Allan Watson

Entry Fee—2s. 6d. each rabbit.

REGULATIONS.

Rabbits must be brought to the Showyard between 5 P.M. and 9 P.M. on Tuesday, the first day of the Show. No lot will be admitted without an Admission Order. Pens, food, and attendance will be found by the Society.

Rabbits may be penned on Tuesday evening and removed at the close of the Show by Exhibitors themselves or their representatives. In the event of neither the Exhibitor nor an authorised representative of the Exhibitor being present to pen or remove Rabbits, they will be penned and removed by men hired and paid by the Society, but this will be done on the understanding that the men are hired to do the work on behalf of Exhibitors, and solely at their risk, and that the Society will be in no way responsible for expenses incurred or loss of or injury to Exhibits by errors or accidents in penning, despatching, or conveying Exhibits.

On the Wednesday, the second day of the Show, the Rabbit Shed will be closed to the public during the Judging. On the last day of the Show the Rabbit Shed will be closed to the public at 4 P.M.; at 5 P.M. Exhibitors or their representatives will be admitted to the Shed to remove Exhibits, provided the Exhibitor has, *not later than* 11 A.M. *on the last day of the Show*, given written notice to the Secretary to the effect that the Exhibitor or the Exhibitor's representative will attend at the Rabbit Shed at 5 P.M. to remove the Rabbits.

Champion Silver Medal for best exhibit in the Rabbit Classes.

First Premium—FIFTEEN SHILLINGS; *Second Premium*—TEN SHILLINGS; *Third Premium*—FIVE SHILLINGS. In each Class in which there are less than four entries the Third Prize of Five Shillings will not be awarded; where there are ten or more entries a Fourth Prize of 2s. 6d. may be awarded. In addition to the Premiums, the Judges may award *one* Very Highly Commended, *one* Highly Commended, and as many Commended tickets in each Class as they consider justified by the number and merit of the entries.

Class.
1. Angora, over 5 months.
2. Angora, not exceeding 5 months.
3. Chinchilla, Buck, over 5 months.
4. Chinchilla, Doe, over 5 months.
5. Chinchilla, Buck or Doe, not exceeding 5 months.
6. Beveren, over 5 months.
7. Beveren, not exceeding 5 months.
8. Rex, any colour, over 5 months.
9. Rex, any colour, not exceeding 5 months.
10. Havana, over 5 months.

Class.
11. Sable Marten, over 5 months.
12. Sable Marten, not exceeding 5 months.
13. Sable Siamese, over 5 months.
14. Sable Siamese, not exceeding 5 months.
15. Squirrel, over 5 months.
16. Silver Fox, any colour, over 5 months.
17. Silver Fox, any colour, not exceeding 5 months.
18. Any variety, over 5 months, for which a class is not provided.
19. Any variety, not exceeding 5 months, for which a class is not provided.

PRIZE MONEY BY SOCIETY . . . . . £30, 17s. 6d.

Special Entry Forms for Rabbit Classes.

HONEY, &c.

Judge: Dr John Anderson, M.A., B.Sc.

(*To be judged at* 11 A.M. *on Tuesday*, 19*th June*)

OPEN CLASSES

Entry Fees—2s. 6d. each.

Class.		Premiums.		
		1st.	2nd.	3rd.
1.	Collection of Appliances suitable for a beginner's outfit for Bee-keeping. A card naming all the articles, along with the price at which they will be supplied for one year from date, to be fixed to the exhibit	20/-	15/-	10/-
2.	Best and most complete Frame Hive for general use, with any improvements. Unpainted	20/-	15/-	10/-
3.	Best and most complete Hive. Unpainted. Price not to exceed 35/-	20/-	15/-	10/-
4.	Six Sections of Comb Honey, excluding Heather Honey	20/-	15/-	10/-
5.	Six Sections of Heather Honey	20/-	15/-	10/-
6.	Six Jars of Run or Extracted Light-coloured Honey, approximate weight 6 lb.	20/-	15/-	10/-
7.	Six Jars of Run or Extracted Medium or Dark-coloured Honey, excluding Heather Honey, approximate weight 6 lb.	20/-	15/-	10/-
8.	Six Jars of pressed Heather Honey in liquid form, approximate weight 6 lb.	20/-	15/-	10/-
9.	Six Jars of Granulated Honey, approximate weight 6 lb.	20/-	15/-	10/-
10.	Two shallow Frames of Comb Honey for extracting purposes	20/-	15/-	10/-
11.	Best display of Honey in any form suitable for a shop window in space 4 feet by 4 feet. Weight of honey not to exceed 40 lb.	60/-	30/-	20/-
12.	Best exhibit of not less than 1 lb. of Wax in any form	20/-	15/-	10/-
13.	Best exhibit of not less than 1 lb. of Wax made into shapes for retail trade and over-counter trade. Convenience in packing to be taken into consideration	20/-	15/-	10/-
14.	Observatory Hive with Queen and Bees—two or more frames	50/-	30/-	20/-
15.	Observatory Hive with Queen and Bees—one frame, no super	40/-	30/-	15/-

(Confined to Scottish Exhibitors.)

16.	One Standard Frame of Comb Honey for extracting purposes	20/-	15/-	10/-
17.	Six Sections of Comb Honey, excluding Heather Honey	20/-	15/-	10/-
18.	Six Sections of Heather Honey	30/-	20/-	10/-
19.	Six Jars of Run or Extracted Medium or Dark-coloured Honey, excluding Heather Honey, approximate weight 6 lb.	30/-	20/-	10/-
20.	Six Jars of pressed Heather Honey in liquid form, approximate weight 6 lb.	20/-	15/-	10/-
21.	Six Jars of Run or Extracted Light-coloured Honey, approximate weight 6 lb.	30/-	20/-	10/-
22.	Mead, made from Honey	20/-	15/-	10/-

SILVER CUP OR TAZZA.

Presented by the late Mr R. Y. Howie, Rutherglen.

1. To be competed for annually at the Highland and Agricultural Society's Show, and awarded to the competitor gaining most points in the Classes for Honey and Wax only, calculated on the following basis: 1st prize, 3 points; 2nd prize, 2 points; 3rd prize, 1 point. In the event of a tie, the competitor having most first prizes to be adjudged the winner. The winner, until the trophy is won outright, shall hold the Cup for one year.

2. The Cup to be won outright by the competitor first winning it three times within five years.

3. Any competitor having official connection with an Agricultural College shall not be eligible to compete.

Silver and Bronze Medals will be awarded by the Scottish Bee-Keepers' Association to the First and Second winners of the greatest number of points in the Classes for Honey and Wax only, calculated on the following basis: 1st prize, 3 points; 2nd prize, 2 points; 3rd prize, 1 point.

PRIZE MONEY BY SOCIETY	£48, 4s. 0d.
CONTRIBUTED BY SCOTTISH BEE-KEEPERS' ASSOCIATION . .	£10, 10s. 0d.
SILVER CUP OR TAZZA PRESENTED BY THE LATE MR R. Y. HOWIE	£6, 0s. 0d.
CONTRIBUTED BY MR JAMES CONEGHAN FOR CLASS 22 .	£1, 1s. 0d.

Special Entry Forms for Appliances and Honey.

RULES AND REGULATIONS.

1. All exhibits must be despatched in time to be delivered at the Showyard not later than 6 P.M. on Monday, the day before the opening of the Show. Under the railway regulations, exhibitors will require to pay return carriage and cartage when despatching. Return carriage-paid labels will be supplied by the Secretary, and must be addressed for the return journey, and have numbers of Classes on same. Non-compliance with this regulation will mean that the exhibit will be left in the Showyard. **Boxes containing hives, jars, or sections must be *screwed* and not nailed, and the hives, bottles, and sections so placed that they can be lifted out and replaced without disturbing the packing.**

2. The number of the exhibit will be sent by the Secretary (as entered on the printed slip) and must be placed on every exhibit—viz., **Jars:** on side of jar about half an inch from the foot. **Sections** and **Frames:** at right top corner of the glass. **Wax:** at right top corner of the glass. Also on **1 lb. Cakes:** on the underside. No goods will be staged unless this rule is complied with. All competitors must leave the Bee Shed by 9 A.M. on Tuesday morning.

3. No card, trade mark, or name of the exhibitor may be placed upon any part of an exhibit. Every article exhibited must be the property of the exhibitor, and all honey must have been gathered in the natural way within Great Britain, Northern Ireland, and Irish Free State, by bees the property of the exhibitor.

4. Comb Honey Sections, 4½ inches by 4½ inches, to be staged in cardboard boxes glazed on both sides, showing not less than 3½ inches by 3½ inches of comb surface clear of points of lacing, but allowing easy access to the Judge. Sections with fixed glass will be disqualified.

Shallow Frames,—no paper edging is permissible and each frame must be exhibited in a separate glazed case.

5. All Run, Extracted, and Granulated Honey must be shown in the usual mercantile Glass Jars holding approximately 1 lb., except in Class 11.

6. No exhibitor shall be allowed to take more than one prize in any one class.

7. The Judge shall be empowered to withhold prizes in case of insufficient merit.

8. Should there be in any class three or less than three entries, the value of the first prize may be reduced at the discretion of the Judge to that of the second, the second to that of the third, and no third prize will be awarded.

9. The Judge will commence his inspection at 11 A.M. on Tuesday, and the Bee Shed will be closed to the public during the judging.

10. Exhibits of Honey may be placed in their positions in the shed before the opening and removed at the close of the Show by exhibitors themselves or their representatives. In the event of neither the exhibitor nor a person with written authority from the exhibitor being present to place or remove the exhibits, they will be placed and removed by men hired and paid by the Society, but this will be done on the understanding that the men are hired to do the work on behalf of the exhibitors, and solely at their risk, and that the Society will be in no way responsible for expenses incurred or loss of or injury to exhibits by errors or accidents in placing, despatching, or conveying exhibits. In the case of exhibits which are not removed by 5.30 P.M. on the closing day of the Show, the Society will hold itself at liberty to hand them over to the railway companies for despatch to the respective exhibitors.

11. No lot can be removed from the yard till 4 P.M. on Friday, the last day of the Show.

12. The Society undertakes no responsibility for the receipt or despatch of exhibits, nor for any injury exhibits may sustain during the Show or otherwise

13. **Railway delivery charges from station to Showyard and back to be paid by exhibitor. See p. 106.**

BUTTERMAKING COMPETITIONS

Judges: *Open and Novice Sections*—William Smith; Miss Mary M'Arthur. *Championship*—William Burkitt.

Entry Fee, 2s. 6d. each Competition.

The Society will hold an open Buttermaking Competition on Wednesday and Thursday, 20th and 21st June, and a Novice Competition on Friday, 22nd June.

The Competitors will be balloted into sections containing, as nearly as possible, an equal number of Competitors, and each section will form a separate competition with separate prizes. The Secretary will forward to Competitors, a few days before the Competitions, a note of the days and hours at which they are required to attend.

The sections and prize money will be as follows:—

WEDNESDAY, 20TH JUNE.

Open Competition.

Section 1	£5, £3, £2, £1.
Section 2	£5, £3, £2, £1.

THURSDAY, 21ST JUNE.

Open Competition (continued).

Section 3	£5, £3, £2, £1.
Championship	*First :* Gold Medal. *Second :* Silver Medal.

Competitors in the Championship Competition will consist of the First, Second, and Third Prize Winners in each of the Sections 1 to 3 inclusive.

FRIDAY, 22ND JUNE.

Novice Competition (confined to Competitors who have never won a prize of greater value than £2 in Buttermaking Competitions)—

Section 1 . . . . £3, £2, £1.

Competitors will be distinguished by Numbers, which, with Competitor's name and address, will be entered in the Catalogue.

The decision of the Directors of the Society in all matters relating to the Competition shall be final.

Entry forms may be obtained from the Secretary, or from Miss J. Macdonald, Hon. Secretary, British Dairymaids' Association, 16 Rutland Square, Edinburgh, who has kindly agreed to receive entries. These must be lodged *not later than Thursday, 24th May.*

PRIZE MONEY BY SOCIETY, £39.

RURAL INDUSTRIES

Judges: Miss Bruce, 1, 2, 3, 4, 5, 6, 7, 8, 18, 20, 21, 24, 25; Miss A. S Paterson, 9, 10, 11, 12, 19, 23, 26; Miss Jessie E. G. Grant, 13, 14, 16, 17, 22; Mrs E. Balfour Graham, 15.

Entry Fee, 2s. 6d. each article.

OPEN CLASSES..

SHETLAND KNITTING.

Class.	*Exhibits to be made from Shetland Wool.*	Premiums. 1st.	2nd.	3rd.
1.	Fine Lace Shawl or Scarf	£3	£2	£1
2.	Fine Lace Goods other than above, *e.g.*, Bed-jackets, Lace Spencers, &c.	3	2	1
3.	Jumper or Cardigan—with or without sleeves	3	2	1
4.	Exhibits other than above	2	1	10/-

(Separate entry for each article.)

TWEEDS.

Class.		1st.	2nd.	3rd.
5.	Harris or other Tweed—Hand-woven	3	2	1
6.	Tartan—Vegetable-dyed and Hand-woven	3	2	1
7.	Carriage Rug or Plaid—Hand-woven	3	2	1

MISCELLANEOUS.

Class.		1st.	2nd.	3rd.
8.	Hand-made Floor Rug (wool)	3	2	1
9.	Specimen of Embroidery—white (to be exhibited unwashed)	3	2	1
10.	Specimen of Coloured Embroidery—silk or cotton	3	2	1
11.	Specimen of Coloured Embroidery—woolwork	3	2	1
12.	Specimen of Old English Quilting	3	2	1
13.	Leather Gloves	2	1	10/-
14.	Specimen of Leather Work other than Gloves	2	1	10/-
15.	„ Furcraft	2	1	10/-
16.	„ Hand-painted Pottery	2	1	10/-
17.	„ Basket Work (Raffia not eligible)	2	1	10/-
18.	Home-spun Yarn—2-3 cuts	2	1	10/-
19.	Specimen of Hand-made Lace other than Crochet	3	2	1
20.	Men's Golf or Kilt Hose	2	1	10/-

£100

RURAL INDUSTRIES—*continued.*

CONFINED CLASSES.

Open to Women's Rural Institutes and Members thereof in the whole of Scotland.

		Premiums. 1st.	2nd.	3rd.	
21.	Floor Rug in Jute	£3	£2	£1	
22.	Soft Toy	2	1	10/-	
23.	Specimen of Italian Quilting	3	2	1	
24.	Socks, 4 ply, plain knitting	2	1	10/-	
25.	Knitted Jumper, 2 or 3 ply	3	2	1	
26.	Article showing Petit Point	2	1	10/-	
					£28 10

PRIZE MONEY BY SOCIETY . . . £128 10

NOTE.—(*a*) No exhibit may be entered in more than one Class.
(*b*) All exhibits must have been completed within the twelve months preceding the Show.

REGULATIONS.

1. The Competition, except where otherwise stated, is open to competitors from all parts of Great Britain, Northern Ireland, and Irish Free State. Societies or Institutes, as well as individuals, shall be allowed to compete.

2. Every exhibit must be the work either of the exhibitor or of a member of the exhibiting Society or Institute, and must have been completed within the twelve months preceding the Show.

3. An entry fee of 2s. 6d. for each exhibit is payable at the time of entry.

4. Exhibits will be received in the Showyard not later than 8 P.M. on Monday, the day before the opening of the Show. Judging will commence at 9.30 A.M. on Tuesday. The section will be closed to the public during the judging. Exhibits shall not be removed till after the close of the Show.

5. In no case shall a prize be awarded unless the Judge deems the exhibit to have sufficient merit; and where only one or two articles are entered in a class, and the Judge considers them unworthy of the prizes offered, it shall be in his or her power to award a lower prize.

6. Exhibits shall be entirely at the risk of exhibitors, who shall be solely responsible for delivery and removal of their own exhibits. In the event of neither the exhibitor nor a person with written authority from the exhibitor being present to place or remove exhibits, these will be placed and removed by men hired and paid by the Society; but this will be done on the understanding that the men are hired to do the work on behalf of the exhibitors and solely at their risk, and that the Society will be in no way responsible for expenses incurred or loss of or injury to exhibits by errors or accidents in placing, despatching, or conveying exhibits. A receipt signed by the exhibitor, on a form to be issued by the Secretary, must be delivered before any exhibit is handed over to the exhibitor or his or her representative.

On the last day of the Show the Shed will be closed to the public at 4-45 P.M., but no exhibit may be removed until 5 P.M.

7. Exhibitors shall be allowed to attach to their exhibits a notice indicating where (in the Showyard or elsewhere) similar articles may be purchased.

8. Exhibits must not be sent to the Society's Office previous to date of Show. Labels, &c., will be posted to Exhibitors about fourteen days prior to the Show.

9. All exhibits to be sent to the Showyard in packing, sufficiently strong, to be used for return.

10. **Railway delivery charges from station to Showyard and back to be paid by exhibitor. See p. 106.**

Special Entry Forms for Rural Industries Section.

HORSE-SHOEING AND SHOE-MAKING

Open to Shoeing-Smiths from any part of Great Britain, Northern Ireland, and Irish Free State.

Horses provided for this Competition cannot be entered in any other Class.

Special Entry Forms for Horse-Shoeing and Shoe-Making Competitions.

HORSE-SHOEING COMPETITION

Judges: Professor William Robb, F.R.C.V.S.; Thomas Paul; William Johnston

THURSDAY, 21st June.

Class 1.—TOWN HORSES (Open Class).

1st Prize, £5 and Silver Tea Service.*
2nd Prize, £5 and Canteen of Cutlery.†
3rd Prize, £5 and Gold Medal.‡
4th Prize, £4 and Gold Medal.§
5th Prize, £3.
6th Prize, £2.
7th Prize, £2.
8th Prize, £1.
9th Prize, £1.

FRIDAY, 22nd June.

Class 2.—TOWN HORSES (For Competitors under Twenty-five Years of Age).

1st Prize, £5 and Gold Watch.**
2nd Prize, £3 and Canteen of Cutlery.†
3rd Prize, £2 and Gold Medal.‡
4th Prize, £1.

* Silver Tea Service given by the Scottish Iron and Steel Co., Ltd., Glasgow.
** Gold Watch given by Messrs William Martin, Sons, & Co., Coatbridge.
† Canteens of Cutlery given by Messrs Neilson & Cleland, Ltd., Coatbridge.
‡ Gold Medals given by the Mustad Horse Nail Company.
§ Gold Medal given by Capewell Horse Nail Company.
Gold Medal, given by National Master Farriers' and Blacksmith's Association, to be awarded to the competitor obtaining the highest number of points in Class 1.

Prize Money by Society	£24
Silver Tea Service and £10 by The Scottish Iron & Steel Co., Ltd., Glasgow	£15
Gold Watch and £5 by Messrs William Martin, Sons, & Co., Coatbridge	£10
Cutlery by Messrs Neilson & Cleland, Ltd., Coatbridge	£8
Gold Medal by National Master Farriers' and Blacksmiths' Association	£4
Gold Medals by Mustad Horse Nail Co. . .	£4
Gold Medal by Capewell Horse Nail Co. . .	£2

REGULATIONS.

1. Entries must be made with the Secretary not later than 2nd May. Entry Fee, 2s. 6d. for each Class. Entry Forms may be had on application.

2. Competitors eligible to compete in the Junior Class may compete in either Senior or Junior Class, but not in both.

3. The Competition will take place in the Showyard, and will be decided by points, time being taken into consideration. Each Competitor must make and fix one fore and one hind shoe, having previously taken off the old shoes. The shoes must be fullered, with low calkins, and with toe-pieces fore and hind. The use of files and wire brushes is not permitted. Each Competitor must bring his own tools, nails, and a striker. The striker will not be allowed to touch the horse's hoof. The local Blacksmiths' and Farriers' Association will provide blowers, forges and anvils. The horses to be shod will also be provided by the Association. Forges and horses will be balloted for.

4. Competitors must attend at the Horse-Shoeing Stance half an hour before they are due to compete.

5. The Competitor and his striker will be admitted to the Yard free of charge on the day of Competition on presentation of tickets which will be sent to the Competitor for the purpose.

The Waverley horse-shoe iron to be used in the Open Class, and the Dundyvan horse-shoe iron to be used in the Junior Class, will be supplied by Messrs Neilson & Cleland, Ltd., Coatbridge, who will also provide the necessary smithy coal.

SHOE-MAKING COMPETITION

Judges: Thomas Paul; William Johnston

WEDNESDAY, 20TH JUNE.

1st Prize, £5; 2nd Prize, £4; 3rd Prize, £3; 4th Prize, £2; 5th Prize, £1.

PRIZE MONEY BY SOCIETY	£8
MESSRS WILLIAM MARTIN, SONS, & CO., COATBRIDGE .	£5
MESSRS NEILSON & CLELAND, LTD., COATBRIDGE .	£2

REGULATIONS.

1. Entries must be made with the Secretary not later than 2nd May. Entry Fee, 2s. 6d. Entry Forms may be had on application.

2. Each Competitor must make one fore shoe and one hind shoe.

3. Each shoe must be made from $18\frac{1}{2}'' \times 1\frac{1}{4}'' \times \frac{9}{16}''$ iron, which will be provided at the Stance.

4. The fore shoe to be fullered and clipped, and the hind shoe fullered, clipped, and toed.

5. The use of files and wire brushes is prohibited.

6. Time allowed will be limited to 40 minutes.

7. Competitors must bring their own tools and a striker, and must attend at Horse-Shoeing Stance 15 minutes before they are due to commence.

8. The Competitor and his striker will be admitted to the Yard free of charge on the day of Competition on presentation of tickets which will be sent to the Competitor for the purpose.

Waverley and Dundyvan horse-shoe iron will be supplied by Messrs Neilson & Cleland, Ltd., Coatbridge, who will also supply the necessary smithy coal.

LIVE STOCK JUDGING COMPETITION

Special Entry Forms for Live Stock Judging Competition.

1. The Society will hold a Live Stock Judging Competition on Wednesday, 20th June, commencing at 10 A.M.

2. The Competition shall be open to all persons not exceeding 23 years of age at the date of the Competition.

3. Teams from Agricultural Colleges or from Young Farmers' Clubs in Scotland shall be allowed to compete. The members of these teams shall also enter as individual Competitors. Five members shall form a team.

4. Entries must be lodged with the Secretary of the Highland and Agricultural Society not later than 10 A.M. on **Thursday, 17th May.** An entry fee of 2s. 6d. shall be paid by each Competitor. Entries of teams must be made in the same way, but no additional fee shall be charged for a team over and above the fee of 2s. 6d. for each individual member.

5. The Stock to be judged shall consist of—

(*a*) Cattle (three classes) . .	Ayrshire. British Friesian. Shorthorn or Aberdeen-Angus.
(*b*) Horses (two classes) . .	Clydesdales.
(*c*) Sheep (three classes) . .	Blackface. Cheviot. Border Leicester.

There will be four animals in each class. The animals to be judged shall be chosen by the Society's Stewards. The Society reserves the right to modify the nature of the classes should difficulty arise in finding suitable material amongst the animals exhibited at the Show.

6. In Judging, breed type shall be taken into account. All stock shall be considered free from acquired blemishes or unsoundness. The Competitors shall judge in groups, and ten minutes shall be allowed for the judging of each class.

7. Competitors are forbidden to discuss the Stock with each other, or with any other person, until the conclusion of the whole Competition.

8. The method of awarding points shall be decided by the Directors of the Society, and their decision in all matters relating to the Competition shall be final.

9. Prizes shall be awarded as follows :—

Individual Competition . . .	£5, £4, £3, £2, £1.
Team Competition—	
1st	£10 and 5 Medium Silver Medals.
2nd	£5 and 5 Medium Bronze Medals.
Special Prize for College team placed highest in Competition . .	£5.

[1] **'Glasgow Herald' Challenge Cup,** value £50, to be awarded each year to the team winning the First Prize in the Team Competition.

[1] **Gold Medal** to be awarded to the highest individual scorer.

The Society reserves the right to reduce the number of prizes in the event of there being less than twenty Competitors in the Individual Competition and less than three teams in the Team Competition.

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[1] Given by Messrs George Outram & Co., Ltd., Glasgow

ABSTRACT OF PREMIUMS.

GIVEN BY THE SOCIETY.

Cattle	£1382	0	0
Horses	951	0	0
Jumping Competitions	207	0	0
Sheep	564	0	0
Goats	42	0	0
Pigs	139	0	0
Poultry	218	15	0
Dairy Produce	51	0	0
Eggs	11	5	0
Fur-Producing Rabbits	30	17	6
Honey, &c.	48	4	0
Buttermaking Competitions	39	0	0
Rural Industries	128	10	0
Horse-Shoeing and Shoe-Making	32	0	0
Stock Judging Competition	35	0	0
Bacon Pig Competition	31	0	0
Medals to Breeders, &c.	50	0	0
Horticultural Section—Gold Medals	60	0	0
Forestry [1]	40	0	0
	£4060	11	6

CONTRIBUTED PRIZES, CUPS, &c.

President's Champion Medals				28	0	0

CATTLE.

*The late Mr William Duthie—Silver Cup	£150	0	0			
*Mr W. M'Nair Snadden—Silver Cup.	50	0	0			
*J. Baird & Co. (Falkirk) Ltd.—Emilio R. Casares, jun.—Memorial Cup	52	10	0			
The Shorthorn Society (and 2 Medals)	40	0	0			
*Mr W. Gilchrist Macbeth—Silver Cup	50	0	0			
*The late Sir George Macpherson Grant, Bart.—Silver Cup	50	0	0			
*Mr Eduardo Estanguet, Argentina—Silver Cup	52	10	0			
*The late Sir John Macpherson Grant, Bart.—Silver Cup	50	0	0			
*Mr Falconer L. Wallace—Silver Cup	50	0	0			
Aberdeen-Angus Cattle Society—Gold Medal	10	0	0			
*Corporation of Edinburgh Perpetual Gold Challenge Cup	100	0	0			
Galloway Cattle Society—Dr Gillespie Memorial Trophy	50	0	0			
Galloway Cattle Society—Silver Cup	50	0	0			
*Mrs Brown, Kirkbrex, Glasgow—Knockbrex Challenge Cup	50	0	0			
*General Sir Ian Hamilton, G.C.B.—Silver Cup	50	0	0			
Miss Monica M. M'Laren	20	0	0			
*Dundee Citizens' Perpetual Silver Challenge Cup	50	0	0			
*Highland Cattle Society of Scotland—Silver Cups	89	5	0			
*Paisley Perpetual Gold Challenge Cup	300	0	0			
*Cowhill Champion Cup	30	0	0			
Ayrshire Cattle Herd-Book Society	20	0	0			
*Fife and Kinross Perpetual Gold Challenge Cup	200	0	0			
*British Friesian Cattle Society—Silver Cup	52	10	0			
British Friesian Cattle Society	50	0	0			
*Lady Rachel Workman MacRobert—Champion Silver Bell	52	10	0			
*The late Lt.-Colonel Charles Brook—Kinmount Challenge Cup	50	0	0			
Red Poll Cattle Society	30	0	0			
Messrs Brown & Polson, Ltd.	10	0	0			
Messrs William MacKean, Ltd.	10	0	0			
				1819	5	0
Carry forward				£5907	16	6

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[1] Grant to Royal Scottish Forestry Society for Forestry Section.

* Challenge Prizes.

ABSTRACT OF PREMIUMS—*continued*

Brought forward . . . £5907 16 6

HORSES.

*Clydesdale Horse Society—Cawdor Challenge Cups	£105	0	0			
*Mr William Meiklem, Kirkcaldy—Gold Challenge Cup	115	10	0			
*Renfrewshire Perpetual Gold Challenge Cup	250	0	0			
"William Taylor" Memorial Committee	10	0	0			
*Dumfriesshire Hunt—Dumfries Centenary Silver Challenge Cup	100	0	0			
Hunters' Improvement and National Light Horse Breeding Society—Gold Medal	5	0	0			
Department of Agriculture for Scotland	40	0	0			
The Highland Pony Society	16	0	0			
National Pony Society	10	0	0			
Shetland Pony Stud-Book Society (and Medal)	10	0	0			
				661	10	0

SHEEP.

*Angus Agricultural Society—Silver Cup	£52	10	0			
"James Archibald" Prize	20	0	0			
*Cheviot Sheep Society—Borthwick Challenge Cup	25	0	0			
Tweeddale Gold Medal	25	0	0			
Society of Border Leicester Sheep Breeders—Gold Medals	20	0	0			
Oxford Down Sheep-Breeders' Association	11	0	0			
*Suffolk Sheep Society—Silver Cup	15	0	0			
Dorset Horn Sheep-Breeders' Association	5	0	0			
				173	10	0

GOATS.

Department of Agriculture for Scotland	£12	0	0			
*The late Lord Dewar—Silver Cup	21	0	0			
*Mrs S. Macdonald—Silver Cup	10	0	0			
				43	0	0

PIGS.

*Dundee Citizens' Perpetual Silver Challenge Cup	£50	0	0			
National Pig-Breeders' Association—Gold Medals and Prize Money	20	0	0			
*Large Black Pig Society—Silver Cup	12	12	0			
Large Black Pig Society (and 2 Medals)	18	0	0			
				100	12	0

POULTRY.

*The late Lord Dewar—Champion Challenge Silver Salver				30	0	0

HONEY.

The Scottish Bee-Keepers' Association (and 2 Medals)	£10	10	0			
*The late Mr R. Y. Howie—Silver Cup or Tazza	6	0	0			
Mr James Coneghan	1	1	0			
				17	11	0

Carry forward £6933 19 6

* Challenge Prizes.

ABSTRACT OF PREMIUMS—*continued*

Brought forward . . .				£6933	19	6

HORSE-SHOEING AND SHOE-MAKING.

The Scottish Iron & Steel Co., Ltd., Glasgow (Silver Tea Service and £10)	£15	0	0			
Messrs W. Martin, Sons, & Co., Coatbridge (Gold Watch and £10)	15	0	0			
Messrs Neilson & Cleland, Limited, Coatbridge (Cutlery, &c.)	10	0	0			
National Master Farriers' and Blacksmiths' Association (Gold Medal)	4	0	0			
Mustad Horse Nail Co. (2 Gold Medals) . . .	4	0	0			
Capewell Horse Nail Co. (Gold Medal) . . .	2	0	0			
				50	0	0

STOCK JUDGING COMPETITION.

*Messrs George Outram & Co., Ltd., Glasgow—'Glasgow Herald' Challenge Cup (and Gold Medal)	50	0	0
	£7033	19	6

* Challenge Prizes.

JOHN STIRTON, *Secretary.*

8 Eglinton Crescent,
Edinburgh 12. *February* 1934.

SILVER MEDALS FOR NEW OR IMPROVED IMPLEMENTS.

See Regulations on page 102.

FORESTRY EXHIBITION.

For information as to above, apply to the Secretary, Royal Scottish Forestry Society, 8 Rutland Square, Edinburgh.

SCOTTISH BACON PIG COMPETITION

Judge: T. Gilliland

Entries close 24th May.

The Bacon Pig Competition will be run on the usual lines. The live pigs will be exhibited and judged at the Show on Tuesday, 19th June, and the carcase and cured bacon stages will be carried through at the Factory of the Scottish Co-operative Wholesale Society, Kilmarnock.

Prize money by Highland and Agricultural Society, **£31**.
Silver Cup and Silver Medal.

For Entry Forms and further particulars apply to—
Dr Alexander Calder, Pigs Marketing Board, 124 St Vincent Street, Glasgow, C.2.

The Society's Show for 1935 will be held at Aberdeen.

MEMBERS ADMITTED SINCE THE LIST WAS PUBLISHED IN APRIL 1933.

ARRANGED ACCORDING TO SHOW DISTRICTS.

(Elected 7th June 1933 and 10th January 1934.)

1.—GLASGOW DIVISION

ARGYLL

Admitted
1933 Campbell, J. D. S , B.Sc. (Agric.), Barmaddy, Dalavich, Taynuilt
1934 Crawford, James A., Home Farm, Islay House, Bridgend, Islay
1934 Duncan, Major George Melville, O.B.E., T.D., Briarlea, Campbeltown
1934 M'Arthur, Donald, Fort Argyll, Campbeltown
1933 Stark, Duncan, Invercoe House, Glencoe

AYR

1934 Bryce, James Lindsay, Craigneath Cottage, Kilmaurs
1934 Dykes, Robert Howie, Laigh Hillhouse Farm, Troon
1934 Findlay, James, Carnell, Hurlford
1934 Hannah, Andrew, London Road Nursery, Kilmarnock
1933 Hendrie, Donald S., Westland, Galston
1934 Jack, Matthew W., Broadstone, Beith
1934 Logan, James M., Burton, by Ayr
1934 Mackie, Archibald, 15 Boyd Street, Largs
1933 M'Nair, Samuel, Merrymouth, Dunlop
1934 M'Nicol, John, Harplaw, Largs
1934 Pollock, John, Horsemuir, Stewarton
1934 Reid, William, 188 Main Street, Kilwinning
1934 Ross, Andrew, Wheatrigg, Kilmaurs
1933 Templeton, Alexander, Torr Farm, Dalrymple
1933 Thomson, J., West Hillhead Farm, Kilmarnock
1933 Walker, Hugh, Threethorns Farm, Kirkmichael

BUTE

1934 M'Alister, Duncan, Nether Ardroscadale, Rothesay

LANARK

1934 Barrie, James, Howford, Lanark
1933 Campbell, William, 19 Hope Street, Glasgow
1934 Clark, James, jun., Windlaw, Carmunnock
1933 Cochrane, Archie, Dunlop Rubber Co., Ltd., 40-46 North Wallace Street, Glasgow, C.4
1933 Cochrane, Robert Leslie, B.Sc., 1 Great Western Terrace, Glasgow
1934 Crowley, John H., 'The Daily Mail,' 43 Hope Street, Glasgow
1934 Duff, Peter Laurence, Ardmhor, Uddingston
1934 Fleming, Alexander, Draffan, Marshill, Kirkmuirhill
1934 Grant, Alexander Sutherland, 141 Stanmore Road, Glasgow
1933 Hamilton, David Douglas, c/o Bannatyne, Drumalbin, Thankerton
1934 Hamilton, James, jun., 68 Market Street, Glasgow, S.E.
1933 Howie, Andrew Allan, 21 Hope Street, Glasgow
1933 Howie, Norman S., 21 Hope Street, Glasgow
1933 Ingram, George, 31 Chancellor Street, Glasgow, W.1
1934 Johnston, Thomas, V.S., 10 Grafton Square, Glasgow
1934 Kemp, Archibald, Braehead, Cadder, Bishopbriggs
1934 Kent, A. B., 1394 Gallowgate, Glasgow
1933 M'Crudden, John, 70 Robertson Street, Glasgow
1933 M'Donald, James D., 39 Hope Street, Glasgow, C.2
1933 Macfarlane, Walter K., Deanston, Airdrie
1934 M'Kerracher, Donald, Allanton Farm, Ferniegair, Hamilton
1934 Murdoch, Miss A. Hope, East Hallside, Cambuslang
1933 Paterson, John (John Wallace & Sons, Ltd.), 34 Paton Street, Glasgow
1933 Paterson, Robert Cassels (A. & G. Paterson, Ltd.), 68 Tennant Street, Glasgow, C.4.
1934 Riddell, Daniel, 47 Market Street, Glasgow, S.E.
1934 Roxburgh, Alexander S., 41-43 Cavendish Street, Glasgow, C.5.
1934 Russell, Mrs William, 89 Brandon Street, Motherwell
1934 Semple, James, 11 Dargarvel Avenue, Dumbreck, Glasgow
1933 Turnbull, James (W. A. Parker & Co.), 45 Hope Street, Glasgow
1933 Walker, William, Avongrange, Hamilton
1934 Wiseman, A. J. T., National Farmers' Union of Scotland, 124 St Vincent Street, Glasgow
1933 Yate, Arthur, 88 York Street, Glasgow, C.2
1934 Young, William, Greenfield, Strathaven

RENFREW

1934 Cargill, William A., Carruth, Bridge of Weir
1933 Clark, Miss Jessie, "Netherlea," Ormonde Mount, Cathcart
1934 Gilmour, John, Cartsbridge Farm, Clarkston, Glasgow
1934 Hastie, Peter, 100 King's Park Road, Cathcart, Glasgow
1934 Love, James, Hope Dairy, Renfrew
1934 Park, James, Gryffewraes, Bridge of Weir
1934 Park, John, Drumcross, Bishopton
1934 Provan, James, Carlibar, Barrhead
1934 Shaw-Stewart, Major Guy, M.C., Ardgowan, Inverkip
1934 Webster, Ernest, 102 Gartmore Road, Paisley
1934 Wilson, Alexander, jun., Thornley Park House, Paisley
1934 Wilson, James, Thornley Park House, Paisley

2.—PERTH DIVISION

ANGUS

(Western District)

1934 Bartlett, Rev. Henry M., Logie Manse, 338 Blackness Road, Dundee
1933 Baxter, George, 120 High Street, Lochee, Dundee
1934 Briggs, Archibald S. (of Messrs William Briggs & Sons, Ltd.), East Camperdown Street, Dundee
1933 Buist, Mrs I., Balgillo House, Broughty Ferry
1933 Coutts, James, 16 and 18 Overgate, Dundee
1933 Dargie, George, Leyshade, near Dundee
1933 Fairlie, Mrs J. M., Kirkton, Monikie, near Dundee
1933 Fenton, James, Solicitor, The Croft, Broughty Ferry
1933 Findlay, William A., C.A., 54 Commercial Street, Dundee
1933 Fitchet, James, Gowanbank Dairy, Lochee, Dundee
1933 Gellatly, Peter, Hillhead, Kinnettles
1933 Graham, Frank, West Nevay, Newtyle
1933 Graham, John Stevens, Denfind, Monikie
1933 Graham, Robert, Pitreuchie, Forfar
1933 Guild, James, 25 Mid Street, Dundee
1933 Harley, Mrs M., Brigton, Douglastown, Glamis
1933 Hendry, Mrs Jessie M., Gagie, by Dundee
1933 Hutton, Robert, 21 Airlie Place, Dundee
1933 Laird, Robert B., Moyness, Broughty Ferry
1933 Laird, Mrs Robert B., Moyness, Broughty Ferry
Langman, Hon. Lady, Balintore, Lintrathen
1934 Low, James Hubert, Seabourne, Broughty Ferry
1933 Nairn, Miss K. E., Ashbank, Magdalen Green, Dundee
1933 Nairn, Mrs William C., Ashbank, Magdalen Green, Dundee
1933 Nicoll, Walter, Forfar Foundry, Forfar
1933 Robertson, Douglas, 33 Provost Road, Dundee
1933 Robertson, James, Belsize, Craigie Avenue, Broughty Ferry
1933 Robertson, Mrs James, Belsize, Craigie Avenue, Broughty Ferry
1933 Robertson, James M., Newton of Baldovan, Downfield, Dundee
1933 Scott, James, 9 Bell Street, Dundee
1933 Smith, David A., West Mains, Dunnichen
1933 Smith, George, 11 Meadow Street, Dundee
1933 Storrie, D. L. (Storrie Thyne & Co., Ltd.), Downfield Nurseries, Dundee
1933 Waterston, Godfrey J., Thornhill, Glamis Road, Forfar
1933 Weighton, Edward, Caddam Farm, Kirriemuir
1933 Young, Charles, jun., Balkello Farm, Tealing, by Dundee

FIFE

1933 Ardbuckle, John, Lower Luthrie, Cupar
1933 Black, Michael G., Edenwood, Cupar
1933 Boase, Mrs Mabel M., The White House, St Andrews
1933 Bonthrone, Robert B., Forthar, Kingskettle
1934 Cameron, James, Scooniehill Farm, St Andrews
1933 Chrisp, John Oswald, Balgreggie Farm, Cardenden
1933 Clark, Mrs Norah, Woodbank, Windygates
1933 Clark, William, jun., Clunie Mains, Kirkcaldy
1933 Drummond, John, Bandirran, Ceres, by Cupar
1933 Edie, Mrs Agnes R., Cornceres, Anstruther
1933 Forsyth, Tom S., Newton of Collessie, Collessie, Ladybank
1934 Gellan, Edward B., Halbeath Pig Farm, Kingseat, Dunfermline
1934 Kinnaird, Thomas, Dogton, Kinglassie
1934 Laing, William, Pitlochie Farm, Kinglassie
1933 Leitch, John Watson, Broomfield Drive, Dunfermline
1934 Low, Captain William A., of Callange, Alleyneghr, St Andrews
1933 Maclay, Alastair M., Brownhills, St Andrews
1934 Milne, Alexander, Dura Mains, Cupar
1933 Mitchell, Alexander, Manager, Central Farmers, Ltd., Methil
1934 Mitchell, Andrew, Easter Lathrisk, Ladybank
1934 Ramsay, Dr J. M., Nether Kinneddar, Oakley
1933 Russell, Mrs, Kingsdale, Windygates
1934 Thomson, James R., Carneil, Carnock, Dunfermline
1933 Wallace, Thomas, Cardenbarns, Cardenden
1934 Wylie, John, Bowhouse Farm, Kinglassie

KINROSS

1933 Baxter, Robert, Pittendreich, Kinross
1933 Cuthbert, D. A. R., Factor and County Clerk, Kinross
1933 Hamilton, Robert Donaldson, Blairnathort, Milnathort
1933 Wilson, George, Flockhouse, Blairadam, Kinross
1933 Young, William S., Mawcarse, Kinross

PERTH

(Perth Show District)

1933 Anderson, Miss Oonah L., Damside, Auchterarder
1933 Bain, Andrew C., Flockloans, Invergowrie
1934 Burrell, Thomas M., Westwood, Perth
1933 Clark, John A., 71-73 South Street, Perth
1933 Drummond, John, of Megginch Castle, Errol
1934 Farquhar, James Findlay, Dowally Farm, Ballinluig
1934 Gordon, Robert John M'Nair, 4 Kinnoull Street, Perth
1933 Graham, Alistair, Hill, Errol
1933 Grant, Alexander, Spittal Hotel, Glenshee, Blairgowrie
1933 Haggart, Mrs James D., Eilean Riabhach, Aberfeldy
1934 Honeyman, Stuart, Arthurbank, by Meigle
1933 Hunter, Iain A., Inchmartine, Inchture
1933 Lawrie, William, Newrow, Methven
1933 MacDonald, Mrs James A., Urlar, Aberfeldy
1933 MacNaughton, James, Assistant Manager, W. S. Ferguson & Co., Ltd., Perthshire Chemical Manure Works, Friarton, Perth
1933 MacNiven, James, Estate Manager, Barns, Auchterarder
1933 Marshall, John, jun., Mid Fordoun, Auchterarder
1933 Morris, William Grant, Over Buttergask, Coupar-Angus
1933 Norwell, Peter S. (Norwell's Perth Footwear, Ltd.), 45-47 High Street, Perth
1933 Reoch, Miss E. M. R., Balgersho, Coupar-Angus
1933 Robertson, James D., Blacksmith, Achnacarry, Trochry, Dunkeld
1933 Smith, Mrs P. Mitchell, Bradyston Farm, Murthly
1933 Stewart, Charles, Balcrochan, Kirkmichael, Blairgowrie
1933 Thomson, James, Meadowside, Coupar-Angus

3.—STIRLING DIVISION

CLACKMANNAN

1934 Doull, Alexander Clark, 10 Alexandra Drive, Alloa
1934 Harrower, William, Alloa Mills, Alloa
1934 Snadden, Francis W., 17 Mar Street, Alloa
1934 Wilson, Gavin, jun., Shannockhill, Tillicoultry

DUMBARTON

1934 Watt, William, Milligs Farm, Helensburgh

PERTH

(Stirling Show District)

1933 Frew, J. G. Russell, Wester Ballindalloch, Comrie
1934 Jones, Mrs Walter, Aberuchill Castle, Comrie
1933 Leitch, Mrs Catherine Jackson, Glenbeich, Lochearnhead
1933 Leitch, Sydney R., Glenbeich, Lochearnhead
1934 Rottenburg, Mrs E. H., Lochlane, Crieff
1933 Wilson, Robert, Greystone Farm, Dunblane

STIRLING

1934 Brown, Ivie, Waulkmilton, by Linlithgow (Stirlingshire)
1934 Johnston, James, Dunmore Farm, Falkirk
1934 Johnston, William, Cashels Farm, Rowardennan, Stirling
1934 M'Donald, George, Ballat, Balfron Station
1934 M'Watt, John S., Managing Director, Robert Miller (Denny), Ltd., Bonnybridge
1934 Mailer, John, Shaw Farm, Cambusbarron
1933 Millar, James Glentirran, Kippen
1933 Millar, Mrs James, Glentirran, Kippen
1933 Morton, Robert R., Balquharrage, Lennoxtown
1934 Rennie, Mrs Dorothy, Ballat House, Balfron Station, R.S.O.
1933 Robb, John B., 11 Barnton Street, Stirling
1933 Shanks, Thomas, Beechfield, Denny

4.—EDINBURGH DIVISION

MID-LOTHIAN

1933 Barr, Miss Mary Isabella Whitelaw, Harburn, West Calder
1934 Bathgate, Robert Haig, Gorebridge
1933 Bell, David, jun., 15 Coburg Street, Leith
1933 Bell, J. C., 15 Coburg Street, Leith
1933 Brown, Charles Marshall, W.S., 5 Thistle Street, Edinburgh
1933 Carruthers, James M. (H. C. Baildon & Son), 73 Princes Street, Edinburgh
1933 Cowper, John, The Farm House, Gogar Mains, Edinburgh

1933 Dryerre, Henry, Ph.D., M.R.C.S., L.R.C.P., Biochemical Laboratories, Royal (Dick) Veterinary College, Edinburgh
1934 Erskine, John M., General Manager, Commercial Bank of Scotland, Ltd., 14 George Street, Edinburgh
1934 Gibson, George (George Gibson & Son), 44 Queensferry Street, Edinburgh
1933 Graham, James F., c/o Messrs Mutter, Howey, & Co., Ltd., 24 Market Street, Edinburgh
1934 Hamilton, Robert, 13 Inverleith Terrace, Edinburgh
1933 M'Fadzean, Hugh, Farm Manager, Shothead, Balerno
1934 M'Millan, Donald (Burns & Laird Lines, Ltd.), The Arcade, 105 Princes Street, Edinburgh
1934 Menzies, John F. (of Messrs John Menzies & Company), 32 Heriot Row, Edinburgh
1934 Moncur, Thomas K., Belford Riding Academy, Edinburgh
1933 Morrison, William Morrison, 24 Buccleuch Place, Edinburgh
1934 Norman, John W., 19 Craigcrook Avenue, Blackhall, Edinburgh
1933 Pentland, William O., Messrs White, Burns & Company, Bonnington, Edinburgh
1933 Tennant, Mrs Betty, Marchwell, Ratho
1933 Walker, Leslie M., B.Sc., Edinburgh & East of Scotland College of Agriculture, 13 George Square, Edinburgh
1934 Watson, Mrs Macdonald, 47A Manor Place, Edinburgh
1933 Waugh, John F., 35 Traquair Park, Corstorphine West
1933 Witney, D., Edinburgh & East of Scotland College of Agriculture, 13 George Square, Edinburgh
1934 Wyllie, James Davidson, 122 Bruntsfield Place, Edinburgh

EAST LOTHIAN

1933 Spurway, Marcus H. U., Nunraw, Haddington
1933 Stephen, Alexander Murray, No. 3 Holding, Ballencrieff, Longniddry

WEST LOTHIAN

1933 Aitken, David R., Riccarton, Linlithgow
1934 Coull, Robert, B.Sc. (Thomas Ovens & Sons, Ltd.), Bo'ness
1934 Sibbald, David G., Cult Farm, Whitburn
1934 Sibbald, John R., Hardhill Farm, Bathgate
1934 Simpson, Peter Alison, Bank House, Whitburn
1933 Stuart, Allan D., The Brighouse, Bathgate
1934 Wood, James, Dundas Home Farm, South Queensferry

5.—ABERDEEN DIVISION

ABERDEEN

1934 Crerar, John, Manager, The Royal Athenæum, Ltd., 7 Union Street, Aberdeen
1933 Cruickshank, John, Greenwards, Hatton
1934 M'Leman, William, Shalloch, Cornhill Road, Aberdeen
1933 Miller, Charles, 14 Regent Quay, Aberdeen
1933 Porteous, James S. (Vigzol Oil Refining Co. (London), Ltd.), 217 Union Grove, Aberdeen
1934 Robertson, David, B.Sc., Ph.D., Zoology Department, Marischal College, Aberdeen

ANGUS

(Eastern District)

1933 Arnot, Mrs David, Templewood, Brechin
1933 Binnie, Charles, Fauldiehill, Arbirlot, Arbroath
1933 Doctor, Andrew, Friock Mains, Friockheim
1933 Harper, Miss Juliet, Blackhall, Brechin
1933 Johnstone, W. Douglas, Kinnaber House, East, Montrose
1933 Low, Charles, Brathinch, Brechin
1934 Moyes, James C., Renmure, Inverkeilor
1933 Napier-Hendrie, Robert A., The Gables, The Mall, Montrose
1934 Samson, David, Helenstone, by Arbroath
1933 Shepherd, David, Inchbare, Brechin
1933 Waddell, Archibald, Butcher, High Street, Arbroath

BANFF

1934 Macpherson, Alexander T., Priestwell, Dufftown
1933 Troup, George, Kinnairdy Castle, Marnoch, Banff
1933 Young, William G., Arradoul Mains, Buckie

KINCARDINE

1933 Borland, William, Balfeich, Fordoun
1933 Monro, George, Castle of Fiddes, Stonehaven

6.—DUMFRIES DIVISION

DUMFRIES

1933 Anderson, James K., Kirtleton, Waterbeck
1934 Borthwick, John, Cowburn, Lockerbie
1934 Johnstone, Thomas Hastings, Quhytewoollen, Lockerbie
1934 M'Quillin, James, Glenapp, Lockerbie
1933 Stewart, Miss Alison, Murrayfield, Lockerbie

KIRKCUDBRIGHT

1933 Dalziel, Lord, P.C., of Borgue House, Kirkcudbright

1934 Dixon, B. O. G., Ernshennie, Colvend, Dalbeattie

1933 Graham, Andrew, Auchengassel, Twynholm

1934 Grossart, William G., Dunjarg, Castle-Douglas

1934 Mackay, Ralph W., Estate Office, Castle-Douglas

WIGTOWN

1934 Cochran, John, jun., High Portencallie, Stranraer

7.—INVERNESS DIVISION

INVERNESS

1934 Abinger, Lord, D.S.O., Inverlochy Castle, Fort William

1933 Baillie, Captain the Hon. G. E. M., of Dochfour, Inverness

1933 Grigor, James M'Intosh, Daviot Lodge, Inverness

1933 Lovat, The Lord, Beaufort Castle, Beauly

1934 MacIver, John M., 5 Victoria Terrace, Inverness

1934 Nicol, Alexander (Scottish Agricultural Industries, Ltd.) (Highland Area), 10 Falcon Square, Inverness

MORAY

1934 Butler, Grigor, East Grange, Kinloss, Forres

1934 MacWatt, Robert A., Pinefield, Elgin

1933 Morrison, John, 273 High Street, Elgin

ORKNEY AND SHETLAND

Orkney.

1933 Craigie, James W., Hall of Clestrain, Orphir, Orkney

1933 Grant, Miss Catherine H. M., N.D.D., Junction Road, Kirkwall

ROSS AND CROMARTY

1934 Buchanan, C. W. E., Achnahenich, Plockton

1934 Matheson, Miss Christina, Agricultural College Office, Stornoway

SUTHERLAND

1933 Mackay, John, Borrobol, Kinbrace, Sutherland

8.—BORDER DIVISION

BERWICK

1933 Gray, W. N., Stonefold, Greenlaw

1934 Wightman, Thomas Allan, Mossfield, Grantshouse

PEEBLES

1933 Ramage, Finlay, Blyth Bank, Dolphinton

ROXBURGH

1934 Aikman, John S., Jedneuk, Jedburgh

1934 Douglas, George Garfit, Gatehousecote, Hawick

1934 Douglas, Thomas Sholto, Gatehousecote, Hawick

1934 Haddon, Andrew, M.A., LL.B., Nisbet Miln, Ancrum

1934 Innes, A. P., Westwood, Hawick

1933 Kemp, George E., Riddell Mill, Lilliesleaf, Melrose

1934 Usher, Sir John T., Bart., Wells, Hawick

SELKIRK

1933 Cameron-Rose, Hugh, Ashkirktown, Selkirk

ENGLAND AND WALES

1933 Barr, J. Fillans, 119 Victoria Street, London, S.W.1

1934 Bosworth, Arthur W. T. (Singleton, Flint & Co., Ltd.), 7 Upper Avenue, Lincoln

1933 Davies, Sydney John, Bardwells, Roydon, Essex, *via* Ware

1933 Drew, Walter (Harrison, M'Gregor, & Co., Ltd.), Albion Ironworks, Leigh, Lancs.

1933 Edlington, T., Phœnix Works, Gainsborough, Lincs.

1933 George, W. Foxton, Manager, Veterinary Department, Boots Pure Drug Co., Ltd., Station Street, Nottingham

1934 Greig, John, Housenrigg, Brayton, Cumberland

1933 Harrison, William (Harrison, M'Gregor & Co., Ltd.), Albion Ironworks, Leigh, Lancs.

1934 Matthews, Neville, 27 Cavendish Square, London, W.1.

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1934 Taylor, Robert, Milton Hall, Brampton Junction, Cumberland

1934 Whillis, R. R., C.A., 8 Park Avenue, Roker, Sunderland

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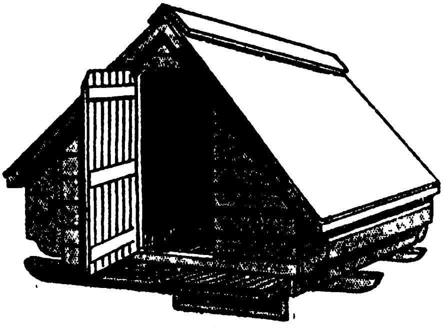

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